S
627.8
U3b
1978

PLEASE RETURN

BACKGROUND ISSUE PAPERS ON
THE LIBBY REREGULATING DAM
AND RESERVOIR

STATE DOCUMENTS COLLECTION

JUN 22 1979

MONTANA STATE LIBRARY
930 E Lyndale Ave.
Helena, Montana 59601

ECONOMICS OF PEAKING POWER
AT LIBBY DAM

AUGUST, 1978

ARNOLD [illegible]
WATER RESOURCES DIVISION
MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

Montana State Library
3 0864 1006 4968 3

VOL

1

INTRODUCTION

In recent months controversy has increased on the proposal by the U.S. Army Corps of Engineers to build a reregulating dam ten miles below Libby Dam and convert power generation at Libby Dam to a peaking power operation. Opposition to the project is growing. The Libby Rod and Gun Club has requested an injunction to halt construction which is getting underway. One of the charges in the lawsuit states that the benefit cost analysis performed by the Corps is inadequate and that the Corps has failed to establish that project benefits exceed project costs. Because federal money can only be spent on projects with a benefit cost ratio greater than 1, a ruling in favor of the Rod and Gun Club on this point would halt the project.

An additional focus of controversy is over the fluctuation criteria used by the Corps to regulate both the level of flows and the allowable changes in flow levels from the current operation of Libby Dam and the proposed operation of the reregulating dam. In response to many concerned letters from his constituents, Senator Hatfield requested information from the Corps on the establishment of the current fluctuation criteria and the value of power production that would be lost if allowable fluctuations were decreased. The Corps provided an estimate on the dollar value of power production to be lost under alternative fluctuation criteria.

Due to the growing controversy the Water Resources Division began a review of various aspects of the Corps' project at Libby. The purpose of this paper is to critically review the Corps' economic analysis and the Corps' reply to Senator Hatfield regarding the effects of changes in the fluctuation criteria on power production.

PROJECT DESCRIPTION

The Corps has begun installation of four more generators in the powerhouse at Libby. Currently the powerhouse has four generators, each with a rated capacity of 105 megawatts (MW) and the additional four will raise the rated capacity

of generation in Libby Dam from 420 MW to 840 MW. The reason for adding more units is to increase the peaking power capacity at Libby Dam and not to increase the total energy output produced. The energy produced depends on the volume of water passing through the generators and the elevation difference, or head, between the lake level behind the dam and the water level below the dam. Since the powerhouse was opened in 1975, all outflows from Libby Dam have been used to generate power, i.e. no water has been discharged through the spillway. Because the addition of four more generators changes neither inflows to the reservoir nor the head, eight generators will not produce more energy than the four currently in place. Although the additional generators will not produce more energy, they will concentrate generation during those hours of peak electrical use.

A reregulating dam will be built ten miles downstream from Libby Dam. The proposed reregulating dam would be seventy feet high, 1,600 feet long, and create a reservoir with a capacity of 30,000 acre-feet. The purpose of the reregulating dam is to smooth out the fluctuations on the river produced by rapid changes in outflows from the powerhouse that would result from peaking power operation.

The following quotes summarize planned average daily Libby Dam releases.

"Average daily releases from Libby Dam will be in the 5,000 to 9,000 cfs range from April through mid-July, permitting Lake Koocanusa to approach its maximum elevation of 2,459 feet. When the lake is nearly full, outflow will be gradually increased to equal inflow, normally about 20,000 cfs. Natural inflow will usually be passed through the dam until sometime in October when flow has receded to about 5,000 cfs in most years. During the winter months, average discharges will be increased to a range of 10,000 to 20,000 cfs while the lake is being lowered in the interest of power production and to provide storage for the next spring's snowmelt. Unusual conditions would require variations of this pattern." . . . . .

Discharge from Libby Dam during peaking operations will be high during the day time and low at night. When the full peaking capacity is utilized, the discharge could go from near zero to near 45,000 cfs in 1 hour, hold near 45,000 cfs from 5-1

hours and then return to near zero again within 1 hour. Usually the transition from low to high flow will be more gradual and the difference between maximum and minimum daily discharge will be less than 45,000 cfs. At times, Libby Dam peaking will not be required and discharge will be held relatively constant for several days or longer."

"Minimum discharge from the reregulating dam will be 2,000 cfs. Tailwater fluctuations will be limited to a maximum of 1 foot per hour, but not more than 4 feet per day during the period May through September; and to a maximum of 1 foot per half hour, but not more than 6 feet per day for period October through April. These constraints are the same as those imposed at Libby Dam with four units operational."[1]

The Final Environmental Impact Statement Supplement completed by the Corps in 1974 describes proposed daily operations in more detail.

"Project Operation. The reregulating reservoir would be operated between elevations of 2100 and 2130 to balance discharges from the main Libby reservoir resulting from peaking operation of the power plant there. Although the pattern of power demand and output would vary, the following description is reasonably representative of normal weekly conditions. The Libby powerplant has been assumed to be in operation at near maximum capacity for a period of seven hours each weekday. Using this example, at 10:30 Monday morning, with the reregulating reservoir at elevation 2104 and the reregulating dam discharging about 13,000 cfs, the turbine wicket gates at Libby Dam would be discharging about 40,000 cfs. This would continue until 7:00 p.m. at 2122, assuming outflow maintained at 13,000 cfs. By 7:30 p.m. all units at Libby Dam would have been shut down and the reregulating reservoir would fall until reaching elevation 2107 by 10:30 the following morning. This pattern would be repeated daily, with reregulating reservoir would reach its maximum elevation of [illegible]. At this point, assuming that the generating units at Libby Dam would not be operated over the weekend, discharges for the reregulating dam would be reduced gradually to about 5,000 cfs and held there throughout Saturday and Sunday.

---

[1] U.S. Army Corps of Engineers, General Design Memorandum Phase II, Volume I, 1975

the reservoir dropping to elevation 2104. Monday morning discharge at the reregulating dam would gradually be increased to 10,000 cfs in preparation for another week of peaking operation of the Libby Dam units. . . . . . .

During the summer, from approximately 1 June to 15 September, consideration would be given to operating the main Libby power plant as a baseload facility in order to attain relative stability in the reregulating reservoir for recreation use.[12]

The same operating rules which currently limit fluctuation in the Kootenai River below Libby Dam would serve to limit the fluctuations below the reregulating dam.

REVIEW OF THE CORPS ECONOMIC ANALYSIS

Table 1 shows estimates by the Corps of power benefits at Libby Dam that would result from these operations.

TABLE 1

Power Benefits at Libby Dam

		Four Units Main Dam Initial Project	Eight Units Main Dam Plus Reregulating Dam
1. Gross average energy	MW	203	203
2. Energy loss due to peaking	MW	1	2
3. Backwater loss	MW	0	0.8
4. Net average energy	MW	202	200.2
5. Dependable Capacity	MW	449	966
6. Capacity factor	%	45	21
7. Energy Value	MILL/kwh	1.61	16.97
8. Annual Energy benefits	$1,000	3,293	29,761
9. Capacity Value	$/kw-yr	64.29	28.17
10. Annual capacity benefit	$1,000	[illegible]	27,210
11. Total annual power benefit	$1,000	32,0[illegible]	56,971
12. Annual benefit in providing reregulation	$1,000		24,[illegible]

SOURCE: U.S. Army Corps of Engineers, General Design Memorandum Phase II, Volume [illegible], 1975 (GDM II, 1975) page [illegible].

---

[12] U.S. Army Corps of Engineers, Final Environmental Impact Statement Supplement [illegible]

The letter from the Corps to Senator Hatfield defined some basic terms.[3]

"Load Factor. The ratio of the average load over a designated period to the peak load occurring in the period."

"Base Load. The minimum load in a stated period of time."

"Peak Load. The maximum load in a stated period of time."

Average load is found by integrating the area under the output curve over the designated time period to get total output and dividing this by the time. Thus you can see that the average load is greater than the baseload and the peak load is, therefore, obviously greater than both the average and baseload. If a project operates at a flat load, the baseload, average load, and peak load are all equal, and the load factor would be 100 percent."

Dependable capacity is defined as follows:

"The dependable capacity of an electric system hydroelectric plant is the capacity which under the most adverse flow conditions of record can be relied upon to carry system load, provide dependable reserve capacity, and meet firm power obligations taking into account seasonal variations and other characteristics of the load to be supplied.". . . . .

"The dependable capacity of a hydroelectric plant to be added to a system is the difference in dependable capacity of the system with and without the new hydroelectric plant." 4

Gross average energy is the average power output necessary to produce the total average annual energy produced. In other words, it is the generating capacity (kW) required to produce the annual energy output as measured in kilowatt-hours during an average streamflow year if the energy was produced at a uniform rate.

Line 1 on Table 1 shows that the gross average energy output will remain at-

---

[3] U.S. Army Corps of Engineers, letter to Senator Hatfield, July [illegible], [illegible], page 2.

[4] Federal Power Commission, Hydroelectric Power Evaluation, Washington, D.C., [illegible], pages [illegible].

changes to 222 MW after the generating capacity is installed. Lines 1, 2, and 4 show that energy losses due to spilling and tailwater losses will slightly reduce the net average energy produced at [illegible] after the additional generators are installed. Tailwater losses result from the slight loss of head that occurs when turbine discharges increase the water elevation below the dam at the outlet of the generators. The dependable capacity will increase from 443 MW to 865 MW with the addition of four more generators. The capacity factor is defined as the ratio of the dependable capacity to average energy. The additional generators reduce the capacity factor from 45% to 21% because although total power capacity will be nearly doubled net average energy production remains about the same. The same amount of energy will be produced over a shorter period and the generators will be closed down a larger percentage of the time.

Power benefits are defined as follows:

The power benefit in the economic analysis of a hydroelectric project is based on the value users would be willing to pay as measured by the cost of obtaining power from the most likely alternative means (e.g., via fossil fuels) in the absence of the project under consideration. . .The unit annual power benefit is expressed in terms of components, (1) annual cost per KW of dependable capacity. Capacity is based on the alternative plant capital costs and fixed operation and maintenance costs, and (2) the cost per KW-hr is the fuel cost and other variable operating costs of an alternative thermal plant.

Total annual power benefits (line 11) are the sum of annual energy benefits (line 9) and annual capacity benefits (line 10). The annual benefits of additional generation (line 12) are the difference between annual power benefits with the four new generators and reregulating dam and without the reregulating dam and additional generators.

The annual energy benefits with the project (line 9) are the value in dollars of the annual amount of kilowatt-hours and are calculated as follows:

[illegible] MW Net average energy
x 8760 hours/yr
[illegible] MWh/yr
x 1000 KWh/MWh
[illegible] KWh/yr
x [illegible] Energy value (mills/KWh)
[illegible] Annual energy value (mills)
÷ 1000 mills/$
[illegible] Annual energy benefits

Rounded off, these annual energy benefits are $3,203,000 as shown in line 8. Similar calculations will reproduce the annual energy benefits that would occur with additional generation and reregulation.

Annual capacity benefits (line 10) without the reregulating dam are calculated by multiplying the capacity value/kilowatt-year (line 9) by the dependable capacity in kilowatts:

449 MW
x1000 Kw/MW
449,000 Kw yr
x64.29 capacity value ($/Kw yr)
$28,866,210 Annual capacity benefit

The sum of energy and capacity benefits without reregulation are total annual power benefits without the additional capacity.

Annual energy benefits	$3,203,000	(line 8)
Annual capacity benefits	+28,866,000	(line 10)
Total Annual Power Benefits	$32,069,000	(line 11)

Annual project benefits are the difference between the value of power with and without the additional capacity:

Total annual power benefits with reregulation	$56,871,000
Total annual power benefits without reregulation	- 32,069,000
Annual reregulation benefit	$24,802,000

The Corps has estimated that the sum of the annual value of the initial costs plus the annual operating costs of the additional facilities is $12,340,000 when evaluated at a 6 7/8% discount rate. The ratio of the project benefits to project costs is:

Annual project benefits	$24,802,000
Annual project costs	12,340,000
Benefit-cost ratio	2.0

These calculations by the Corps state that the value of operating [illegible] MW at generation [illegible] of their full capacity produce almost $25,000,000 greater annual benefits than are produced now when 480 MW of capacity are operated at [illegible] of their full capacity. This occurs even though the total output of kilowatt hours from the peaking operation is slightly reduced due to backwater and peaking losses of [illegible] average energy. The power benefits for both alternatives are measured by the cost of producing this power by the least-cost alternative method of producing the same quantity of energy with the same distribution of output. The energy and capacity values in Table 1 differ greatly in the different cases because different alternative technologies are estimated to be the least-cost alternatives to the current operations (nuclear power) and the proposed operation (combined cycle generation).

Current standard procedures for estimating the benefits of additional generating capacity require two separate evaluations. The first step is to consult projected future power demands to determine if the projected demands from the regional power pool exceed the projected regional capacity by the output of the proposed project. For projects in the Pacific Northwest (PNW) the Corps uses projections supplied by the Pacific Northwest Utilities Conference Committee (PNUCC), a group of public and investor owned utilities.

The Bonneville Power Administration (BPA) Role EIS describes the PNUCC projection as follows:

"In the Pacific Northwest, where virtually all utilities are either directly or indirectly interconnected with one another and with BPA, whose facilities are in turn connected with the two federal agencies which own and operate the largest hydroelectric generating facilities in the region, load-resource planning is done for the region as a whole. Each year a forecast of the total loads of all the cooperating utilities together is juxtaposed in tabular form with the current schedule of existing power generation, and planned generating resources to determine the potential need for additional generating facilities beyond those already planned. The fore-

resource survey, which covers 20 years into the future. The survey determines the optimal size of such additional generation, the time when it would be needed to meet most [illegible] demands, whether the planned new facilities should provide peaking capacity or energy [illegible], the general location of the new facilities, and whether they should be constructed and owned by the Federal Government, by investor-owned utilities, by public utilities or by some combination of these.

The projections used for Libby Dam were developed for the West Group area which includes Northern Idaho, Washington, Oregon, except the SE corner, a portion of northern California, the load of Pacific Power and Light Company and BPA in western Montana and BPA load in Southern Idaho. Because most electricity in the PNW is produced by hydropower the regional power capacity varies according to precipitation and inflow into the Columbia Basin. Projected power capacity is determined by estimating the capacity that would be available during the period of lowest streamflow on record. The reliability criteria used in projecting the capacity is summarized in Table 2.

TABLE 2

MAJOR GENERATION RELIABILITY CRITERIA IN THE PACIFIC NORTHWEST POWER POOL

Criterion

Planned peak generating capacity will exceed peak Pacific Northwest demand by 12 percent in the planning year, increasing at a rate of 2 percent per annum up to 20 percent.

Installed peak generating capacity will be such that the probability of a loss of load will not exceed [illegible] and [illegible] maintenance.

In planning [illegible] peak generating capacity [illegible] the [illegible].

Energy reserve capability [illegible] percent [illegible].

[illegible] Pacific Northwest [illegible] Committee [illegible] the Pacific Northwest [illegible], 1977, [illegible]

New thermal generating units will be assumed to operate at [illegible] percent of capacity in the first year of operation, and at 75 percent in subsequent years.

Assume that time between site selection and energy production is [illegible] months for coal-fired plants and 114 months for nuclear plants. [illegible] of construction [illegible] unit availability [illegible] annual basis, if delays occur.

For load-carrying and energy production purposes, water availability will be assumed equal to that of the period of lowest streamflow on record.

Regulate hydroelectric energy production during the year so that the probability that reservoirs will be full on July 31 of the next year is [illegible] percent. Do not permit monthly reservoir levels to fall below those of the same month of the period of lowest streamflow on record.

Operating reserve--Be capable of again meeting demand 10 minutes after the largest single generation failure contingency (currently 1,200 MW of generation) by interrupting service to interruptible customers and by bringing additional generating units on-line.

Spinning reserve--Provide reserves of 300 MW, plus 1 percent of the peak generation for the day, capable of being put into operation in approximately 5 minutes.

(Source: BPA Role EIS, Part I, Page II-30)

If the first step in project evaluation shows that projected capacity available to meet the [illegible] reliability criteria falls short of the projected demand an evaluation of alternative methods for meeting the projected demand is performed. The purpose of the evaluation is to determine if the proposed project will produce the power at a lower cost than the next best alternative. The economic benefits of a project are defined as the costs avoided by building the proposed project rather than the next best alternative. Thus any project that is cheaper than the next best alternative will have a B/C ratio greater than 1, regardless of how much it costs because the alternative costs are still greater.

In evaluating the benefits of converting a hydroelectric plant from [illegible] the costs for the least-cost alternative to the hydroelectric plant are compared to the costs required to build the least cost alternative of the proposed [illegible] operation. As shown in Table 1 the benefits of converting a hydroelectric [illegible] the least cost [illegible].

The Federal Energy Regulatory Commission (FERC), formerly the Federal Power Commission (FPC) provides estimates of the least-cost alternative to hydropower generation operating at different capacity factors. The alternative costs supplied by the FERC to the Corps for use at Libby Dam are shown in Table 3. The difference between the "Value of Power" columns and the "Alternative Cost of Federal Financing" columns is the discount rate selected to amortize capital costs. The "Value of Power" method uses a weighted average of 75% public non-federal financing at 7.25 and 25% private financing at 10%. The "Federal Financing" method uses a discount rate of 6 7/8%. The costs presented in the table are the capacity, energy, and total costs for the least cost alternative to a hydropower plant operating at the capacity factor specified in the left-hand column. For example, Table 1 indicates capacity costs for alternatives to the existing hydroelectric plant at Libby which operates at a 45% capacity factor to be $64.29 when estimated using value of power financing. Energy costs for this alternative were quoted in Table 1 to be 1.31 MILLS/KWH. This value is interpolated by averaging the energy costs for alternative plants with 40% and 50% capacity factors. Values in the "Total" columns are equal to the sum of the energy and capacity costs divided by the dependable capacity. The technology types identified between the columns identify the generating technology which provides the least cost alternatives costs listed in the table. Notice that combustion turbines are the least cost alternative to hydro plants with a low capacity factor and are the only efficient alternatives to a hydro plant that is used relatively infrequently for peaking purposes. Combustion turbines have a low capacity or capital cost but very high operating costs. Nuclear plants, on the other hand, have high capital costs but low operating costs and are the most efficient alternatives to hydro plants that are operated with a high capacity factor.

A major flaw of the Corps economic analysis on additional generation at Libby Dam [illegible] (1) [illegible] of the additional [illegible] [illegible] (2) [illegible] of the alternative cost [illegible] technology [illegible] benefits.

Table 4

Power Values and Alternative Costs
Pacific Northwest Region
17 Dec 1974

Plant Capacity Factor	Value of Power 75% Public & 25% Private Financing			Alternative Cost Federal Financing 5-7/8% Interest		
Percent	Capacity $/Kw-Yr	Energy Mills/Kwh	Total $/Kw-Yr	Capacity $/Kw-Yr	Energy Mills/Kwh	Total $/Kw-Yr
1.0	13.46	39.00	16.88	8.39	39.00	11.81
2.5	13.56	33.07	20.80	8.46	33.07	15.70
5.0	13.73	31.11	27.36	8.57	31.11	22.20
7.5	13.88	30.38	33.84	8.67	30.38	28.63
9.0	–	–	–	8.73	30.12	32.48
9.0	–	–	–	18.15	17.90	32.26
10.0	14.02	30.03	40.33	18.36	17.77	33.93
11.0	14.10	29.96	42.97	–	–	–
11.0	26.31	17.63	43.30	–	–	–
12.5	26.63	17.46	45.75	18.83	17.46	37.95
15.0	27.15	17.26	49.82	19.32	17.26	42.00
17.5	–	–	–	19.79	17.10	46.00
17.5	–	–	–	43.32	2.04	46.45
20.0	28.16	17.00	57.94	43.32	2.00	46.82
25.0	29.21	16.85	66.11	43.32	1.93	47.55
26.5	29.50	16.82	68.55	–	–	–
26.5	64.29	1.92	68.75	–	–	–
30.0	64.29	1.89	69.25	43.32	1.89	48.29
35.0	64.29	1.85	69.95	43.32	1.85	48.99
40.0	64.29	1.83	70.70	43.32	1.83	49.73
50.0	64.29	1.79	72.13	43.32	1.79	51.16
60.0	64.29	1.76	73.54	43.32	1.76	52.57
65.0	64.29	1.75	74.25	43.32	1.75	53.28
70.0	64.29	1.74	74.96	43.32	1.74	53.99
75.0	64.29	1.73	75.66	43.32	1.73	54.69
80.0	64.29	1.73	76.41	43.32	1.73	55.44
90.0	64.29	1.72	77.85	43.32	1.72	56.88

Cost Prices: 1 July 1974

In the Final Environmental Impact Statement supplement released in September, 1974 the Corps described the need for additional generation as follows:

> "If additional units were not installed at Libby Dam and the reregulating dam not constructed, the potential peaking capability would be foregone. The result would contribute to unavailability of electric power under critical streamflow conditions when needed for industry, agricultural, public services, or domestic purposes. At the present time (1974-1975), a deficit of 1,4[illegible] megawatts average energy and 1,740 megawatts peaking power exists in the Pacific Northwest West Group under critical streamflow conditions. [illegible] of this [illegible] in the winter of 1973-1974 [illegible] result in insufficient power to meet all demand. Thus, there may be said to be an immediate demand for any feasible power resource. The 420 megawatts of additional peaking power to be provided, with reregulation, at Libby Dam in 1982-1983 would make a substantial contribution to maintaining a balance between power demand and resources."[5]

This [illegible] ignores the obvious fact that future generation will do nothing to relieve current shortages and that a project is only justified if demanded deficits are projected in the period after the project is in operation. If additional generation from other plants can be expected to create regional peaking surpluses after 1980 in the absence of peaking generation at Libby then the benefits of additional generation at Libby are near zero and the project is not justified. Table 4 shows the PNUCC load projections for the West Group made in 1975, 1976, and 1977 for 1978-1990.

TABLE 4

1975, 1976, and 1977 PNUCC Load[1] Projections
(Megawatts)

	Projected Peak Loads			Projected Energy Loads		
Period	1975	1976	1977	1975	1976	1977
78-79	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
79-80	[illegible]	[illegible]	[illegible]	[illegible]	18,330	[illegible]
80-81	21,11[illegible]	[illegible]	[illegible]	[illegible]	19,050	[illegible]
81-82	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	19,21[illegible]
82-83	[illegible]	[illegible]	[illegible]	20,6[illegible]	20,5[illegible]	[illegible]
83-84	[illegible]	[illegible]	[illegible]	21,3[illegible]	21,031	[illegible]
84-85	[illegible]	[illegible]	[illegible]	[illegible]	22,251	21,2[illegible]
85-86	[illegible]	[illegible]	[illegible]	[illegible]	23,14[illegible]	[illegible]
86-87	[illegible]	[illegible]	[illegible]	[illegible]	24,1[illegible]	[illegible]
87-88	[illegible]	[illegible]	[illegible]	[illegible]	25,1[illegible]	[illegible]
88-89	[illegible]	[illegible]	[illegible]	[illegible]	26,2[illegible]	[illegible]
89-90	[illegible]	[illegible]	[illegible]	[illegible]	27,400	[illegible]

---

[1] [illegible]

¹Values are for the peak demand load [illegible] periods.

SOURCES: Power Planning Committee (PNUCC), "Review of Power Planning in the Pacific Northwest Calendar Year 1975" p. [illegible], and "Review of Power Planning in the Pacific Northwest, Calendar Year 1976", p. [illegible]; BPA File [illegible], page [illegible].

Table 9 shows increases in generating capacity for the West Group as they were projected by PNUCC in 1975, 1976, and 1977.

TABLE 9

PNUCC NET PEAK RESOURCE¹ PROJECTIONS 1975-1977
(Megawatts)

	Projected Peak Net Resources			Projected Average Net Resources		
Period	1975	1976	1977	1975	1976	1977
78-79	29,970	[illegible]	28,232	15,[illegible]	15,148	15,[illegible]
79-80	32,265	32,369	31,271	15,[illegible]	15,968	15,[illegible]
80-81	[illegible],719	[illegible]	31,731	16,052	16,718	16,265
81-82	32,041	32,[illegible]	33,706	17,[illegible]	17,[illegible]	17,[illegible]
82-83	34,766	33,883	33,667	18,[illegible]	17,941	17,5[illegible]
83-84	35,940	36,342	34,495	20,046	20,068	18,04[illegible]
84-85	36,[illegible]	35,350	36,456	21,312	21,108	19,[illegible]
85-86	38,515	36,420	38,152	22,305	22,307	21,173
86-87	37,536	39,476	37,917	23,168	23,511	21,[illegible]
87-88	40,196	39,143	40,194	24,073	23,713	22,[illegible]
88-89	40,114	40,083	39,632	24,049	24,156	23,[illegible]
89-90	38,715	37,505	40,342	24,315	24,302	25,07[illegible]

¹Net resources are gross resources minus reserve requirements and other capacity adjustments. Gross resources are the combined capacity of all generating plants in the Power Pool. Reserve requirements and other adjustments are subtracted because these resources are not always available due to lowered streamflows, plant maintenance and other factors.

SOURCES: Power Planning Committee, PNUCC, "Review of Power Planning in the Pacific Northwest Calendar Year 1975" p. 90; and "Review of Power Planning in the Pacific Northwest, Calendar Year 1977", p. [illegible]; BPA File [illegible], page V-[illegible].

Table 8 shows that from 1975-1977 each successive PNUCC forecast has [illegible] lowered loads for the years 19[illegible]-19[illegible]. For example, the projected peak loads for [illegible] 1983, [illegible] in which [illegible] is scheduled to shift to peaking operation, have decreased [illegible] from [illegible] MW to [illegible] MW.

Table 9 indicates that net resource projections have also been declining. The [illegible] Table 8 which compares [illegible] [illegible] [illegible] [illegible].

because projections of loads are declining faster than the projections for additional resources scheduled to meet these projected loads are declining. For [illegible] the projected surplus of peaking power is 1270 MW, an increase of 340 MW over the peaking surplus projected in 1977.

Table 6 shows the PNUCC projected surpluses or deficits of regional resources. These reflect the net difference between projected loads and projected resources as shown in tables 4 and 5.

TABLE 6

1975, 1976, and 1977 PNUCC Projections of Surpluses or Deficits (Megawatts)

Year	Projected Peak Surplus or (Deficit) 1975	1976	1977	Projected Average Surplus or (Deficit) 1975	1976	1977
8-79	2,025	2,025	3,1[illegible]	(2,15[illegible])	(1,237)	(1,09[illegible])
[illegible]-80	2,500	[illegible]	3,41[illegible]	(2,00[illegible])	(1,17[illegible])	(1,5[illegible])
0-81	1,606	1,555	3,[illegible]25	(3,03[illegible])	(2,517)	(2,109)
1-82	977	557	1,4[illegible]	(1,41[illegible])	(2,5[illegible])	(2,1[illegible])
[illegible]	301	255	1,2[illegible]	(1,31[illegible])	(1,6[illegible])	(2,[illegible])
[illegible]	2,251	2,21[illegible]	1,357	1,03[illegible]	(1,23[illegible])	(2,07[illegible])
[illegible]	103	199	3,[illegible]	941	(1,11[illegible])	(1,085)
[illegible]	700	66[illegible]	3,1[illegible]	(467)	(541)	(77[illegible])
[illegible]	66	[illegible]	3,145	(117)	(421)	(45[illegible])
[illegible]	(734)	1,9[illegible]	3,401	220	(1,441)	(53[illegible])
[illegible]-89	(2,993)	3,00[illegible]	1,7[illegible]	(1,89[illegible])	(1,771)	(1,232)
-90	(5,039)	5,4[illegible]	3,407	(3,03[illegible])	(2,[illegible])	1[illegible]

Sources: Power Planning Committee, PNUCC, "Review of Power Planning in the Pacific orthwest Calendar Year 1976", p. 37 and "Review of Power Planning in the Pacific North-st Calendar Year 1977", p. 35, [illegible] EIS, page [illegible].

Table 6 indicates that the period from 1978-1986 is projected to have a surplus of peaking capacity and deficits of average energy. The Corps nevertheless has concluded that great benefits will be derived by converting Libby Dam from the current semi-baseload operation to a peaking operation. These are mutually exclusive alternatives because massive releases for peaking power preclude the continuous operation required of a baseload plant. There just isn't enough water to run eight generators at full capacity during the peaking hours and maintain even discharges during off-peak hours for baseload generation.

The [illegible] in the next [illegible] at 57,637 MW. By comparison, the peaking [illegible]

Table 7

PACIFIC NORTHWEST UTILITIES CONFERENCE COMMITTEE WEST GROUP AREA
COMPARISON OF ACTUAL WITH ESTIMATED WINTER PEAK FIRM LOADS
(MEGAWATTS)

[illegible]	1965-66	1966-67	1967-68	1968-69 1/	1969-70	1970-71	1971-72	1972-73	1973-74	[illegible]
[illegible]	11,735	12,766	[illegible]	14,331	15,334	16,308	17,317	[illegible]	[illegible]	[illegible]
[illegible]		12,669	[illegible]	[illegible]	[illegible]	16,798	17,701	[illegible]	19,990	[illegible]
[illegible]			13,919	15,021	16,071	[illegible]	17,427	[illegible]	[illegible]	[illegible]
[illegible]				15,032	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]					[illegible]	[illegible]	17,125	[illegible]	[illegible]	[illegible]
[illegible]						[illegible]	17,061	[illegible]	[illegible]	[illegible]
[illegible]							17,022	[illegible]	[illegible]	[illegible]
[illegible]								[illegible]	[illegible]	[illegible]
[illegible]									[illegible]	[illegible]
[illegible]										[illegible]
[illegible]	[illegible]	[illegible]	13,309	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

1/ [illegible] measured at a number of weather stations [illegible]

Source: BPA [illegible], Part I, page IV-81.

Table 8

PACIFIC NORTHWEST UTILITIES CONFERENCE COMMITTEE WEST GROUP AREA
PERCENT DEVIATION BETWEEN ACTUAL AND ESTIMATED WINTER PEAK FIRM LOADS

Date of Estimate	1965-66	1966-67	1967-68	1968-69 1/	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
[illegible] 1)	[illegible].8	8.6	1.8	(8.4) 2/	2.0	5.1	2.5	0.0	5.3	13.[illegible]
[illegible] 1)		7.9	1.5	(6.[illegible])	4.7	6.4	4.7	2.2	[illegible]	[illegible]
[illegible] 1)			4.4	(3.4)	6.2	7.1	3.2	5.9	7.8	10.[illegible]
[illegible] 1)				(3.4)	5.7	7.1	2.9	3.1	6.[illegible]	10.[illegible]
[illegible] 1)					5.0	5.5	1.5	1.5	5.8	[illegible]
[illegible] 1)						4.3	1.1	1.8	5.6	1[illegible].1
[illegible] 1)							0.9	0.3	5.3	11.[illegible]
[illegible] 1)								(1.6)	5.0	11.8
[illegible] 1)									2.3	11.1
[illegible] 1)										11.1

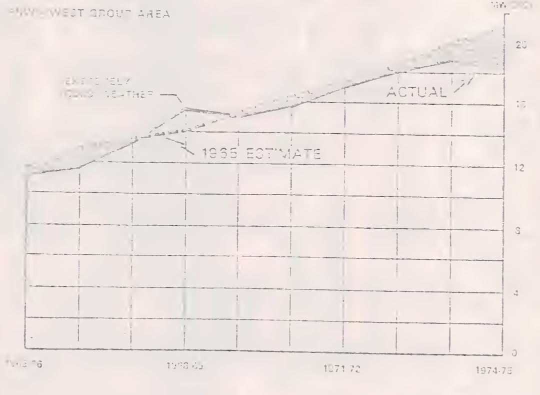
1/ [illegible] at a number of weather stations. [illegible] 1968.

2/ Parentheses indicate actual loads greater than estimated loads.

Source: BPA EIS, Part I, page IV-82.

Figure 3

ESTIMATED VS. ACTUAL WINTER FIRM PEAK LOADS



Source: BPA EIS, Part I, page IV-73

is about 7 percent of the total capacity. Is this an adequate margin of safety? Tables 7, 8, and 9 present comparisons of projected and realized winter peaking loads.

Table 9 shows that actual loads have generally been less than predicted loads and that with the exception of estimates for 1974-1975 projected errors have usually been less than 7 percent. Also, it should be noted that the projected surpluses are surpluses above the capacity available for the period of historical low streamflows. This capacity includes a 12 percent reserve margin and the other reliability criteria mentioned previously.

The 1977 projections estimate that there will be a surplus of peaking capacity and a deficit of average energy so even if additional capacity were added to permit peaking operations, the current method of operations is likely to be the optimal use of the capacity. The PNUCC projections indicate that if added, the proposed additional capacity for peaking would remain idle and that annual project benefits would be close to zero through 1989.

This conclusion is derived from the 1977 PNUCC projections which were not available during 1977 when construction contracts were planned. The 1976 projections available at that time indicate peaking deficits would occur for the periods between 1982-1983 and 1984-1987. The additional 966 MW of generation at Libby is included in the peaking projections starting in 1983. Because the surpluses projected by PNUCC in 1976 are less than this amount a deficit would be shown for these years with the 1976 projections if Libby peaking facilities were not in service.

The Corps uses the alternate cost methodology to estimate the power benefits produced by a conversion to a peaking operation. Power benefits are the difference between the least cost alternative that can reproduce likely future outputs that would occur without the project and the least cost alternative to produce project outputs. To be correct this methodology must meet three criteria: (1) the [illegible] the power purchasers must exceed the [illegible] as measured by the alternative cost [illegible]. This criterion [illegible] willingness to pay for the output [illegible]

exceed the alternative cost of the output. Otherwise output priced at the full cost of producing it would remain unsold and plant capacity would be idle. The Corps' proposal for Libby has failed this test because 1977 PNUCC projections show a surplus of peaking capacity through 1988-1989 and the value of power to purchasers is about zero if there's more than they'll buy at likely future prices. (2) The technologies selected as least cost alternative to the future operations without the project and to the proposed project must be a very good substitute. The least cost alternative to peaking operations must be able to produce the same peaking power output on the same schedule as the proposed peaking operation. Otherwise it is not a usable alternative at all and obviously not a least cost alternative. The Corps' selected alternatives are a nuclear plant as an alternative to the future operation without four more generators and a combined cycle plant as the alternative to the proposed peaking operation.

Although information is not available to adequately assess the Corps' choice of a nuclear plant as the least cost "without" alternative it appears to be an implausible choice. As Table 4 shows nuclear plants have very high fixed costs and very low operating costs. Their principal use is for baseload power because operating costs are low and because several hours is required to increase output in response to increased demands. Nuclear plants are not well-suited to the rapid shifts in output required of a peaking plant.

Current Libby Dam is operated as a semi-peaking operation. For example, during typical operations in July 1978 outflows have been 9,000 cubic feet per second (cfs) during the night. From 7 a.m. to 10 p.m. outflows have increased to 20,000 cfs and reduced back to 9,000 cfs over a 3 hour period in the evening. Over daily operations hydropower output is approximately proportional to outflows because daily outflows are not sufficient to change the lake elevation. Currently at Libby Dam power output during the day is more than double typical nightly output and this change is made within 3 hours. The proposed combined cycle alternative could only duplicate this performance if it is inefficiently operated at less than half its full capacity at night

or if both night and day it generated power equal to Libby's [illegible]. By selecting a nuclear baseload plant as the alternative to the proposed [illegible] the Corps appears to have estimated the benefits of converting from baseload operations to complete peaking operations rather than from semi-peaking operations to peaking operations. This procedure produces an artificially high estimate of benefits because the benefits available without the project are claimed as project benefits. (3) Finally, the alternative cost methodology will correctly estimate project benefits only if the costs of the alternatives and the costs of the proposed project are correctly estimated. An evaluation of this issue is difficult because the Corps benefit and cost estimates have changed rapidly. Earlier in this paper a B/C ratio of 2.0 using "value of power" financing was cited from the General Design Memorandum Phase I, Volume 1, 1975. The appendices in Volume II of the Memorandum document the discovery that revised FPC methods for estimating benefits drastically reduced project benefits. Using "Value of Power" financing the B/C ratio is .955. Because a project can't be funded unless the B/C ratio with federal financing is greater than 1.0 a search for cost cutting device was launched. A memo dated June 17, 1976 from the Chief of the Engineering Division to the District Engineer documents this distress.

"As you are aware, FPC has issued new methods for computing alternative power values which significantly reduce project benefits. While these methods are being questioned, it is obvious that every effort must be made to insure a viable project with an adequate B/C ratio. The project increases should therefore be scrutinized in all areas to eliminate unjustified cost, delete unnecessary features of work and streamline the design to a minimum for a safe and functionally adequate structure."[5]

The recommended solution was to eliminate the baffled chute spillway which served to ensure [illegible], to [illegible] archaeological costs from the B/C ratio [illegible] and to economize on riprap and other [illegible] work [illegible]. These revisions lowered costs by $15.1 million and [illegible] from [illegible] project "[illegible]" B/C ratio to 1.1.

---

[5] GDM Phase II, Volume 1, 1977, page [illegible].

In John Duffield's critique of the B/C analysis done by the Corps he shows their 1980 estimates with annual costs of $10,[illegible],000 annual benefits of $2[illegible], and a B/C ratio of 2.[illegible]. These estimates are for value of power financing and a 7 [illegible] discount rate for project costs. The project is revived and heading once again.

The deletion of [illegible] costs on the ground that non-reimbursable costs need not be counted makes no sense at all. This criteria for inclusion would eliminate all flood control costs because flood control is also a non-reimbursable purpose. A project operated solely for flood control would thus have display zero costs and an infinite B/C ratio. The basic rule for B/C analysis is that all costs necessarily incurred in achieving the project benefits must be counted, regardless.

The Corps also failed to consider the recreational losses resulting from the inundation of 10 miles of the Kootenai River. These losses include losses because recreators are displaced from the reregulating stretch and must go to less desirable sites. Other recreational losses includes the losses due to poorer fishing downstream from the proposed dam because spawning migrations to the Fisher River have been blocked. Still another category of recreational losses are the option values for use of the resource by those who would pay for the option of future use although currently they are not recreational users. Certainly, all those who pass and sign petitions protesting the project would suffer option losses if they are not regular users. This includes those signing petitions in Helena. Active opposition by the Libby Rod and Gun Club clearly indicates that local sportsmen believe they would suffer a substantial loss if the project is built. In order to correctly use the alternative cost approach for project benefits the following procedure should be adopted.

The first step is to run reservoir operations studies for a "future without" situation and for the future with additional generating capacity and reregulating dam. [illegible] "future without" operation [illegible]

are currently established. Then the least cost alternative means of providing each of these alternative power scenarios should be identified. For the "Future without" case this would include a nuclear plant for the baseload and the use of a combustion turbine or combined cycle plant for generation above the output of the baseload alternatives. Another choice for the peaking component of the "future without" would be the purchase of peaking power from the Northwest Power Pool or elsewhere.

Because the alternative cost methodology is only valid if the value of the power to customers is worth more than the alternative cost, the next step is to determine the value of additional peaking capacity to customers. The benefits of additional peaking power are only the value of the additional increment of system reliability unless (1) reserve margins are non-existent and the increment is necessary to avoid outages, or (2) the incremental unit is less costly than the operating costs of other existing generation and operating costs of other units are avoided by operating at Libby rather than elsewhere. PNUCC projections assert that peaking surpluses and reserve margins are more than adequate. This means that the sole benefit of additional peaking capacity at Libby Dam before 1989-1990 is the expected value of outages prevented due to additional reserve margins plus net savings realized by closing down peaking generation elsewhere.

A determination of the value of incremental system reliability would estimate probability distribution functions for forced outages that would occur with and without the additional capacity. The difference between the means of these distributions is the expected value of the number of hours of outages prevented. The final step is to consider whether the expected annual number of outage hours prevented are worth more than the money saved by delaying the project until the peaking capacity is needed for production and not merely in addition to the reserve capacity. An analysis of the benefits and costs of delaying the project would count as benefits the alternative productive use of capital funds during the delay. The costs of the delay are the value of system reliability foregone [illegible] savings from closing peaking plants which are foregone as a result of the delay.

THE CORPS' RESPONSE TO SENATOR HATFIELD

Senator Hatfield asked the following question of the Corps and received the answer quoted below:

"Question: The maximum allowable criteria for streamflows in the winter is six feet of fluctuation per day. I would appreciate an analysis of total power production at the reregulation criteria of six feet, then one foot increments down to zero or the practical minimum. Put another way, how much total power would be lost if the fluctuations were gradually scaled back to negligible amounts? What are you really losing?"

"Answer: The number and size of units, initially and ultimately, at the main dam and the size of the reregulating reservoir were based upon criteria contained in DM 6. The power studies are complex and time consuming, and therefore, specific values of power loss resulting from decreases in the maximum daily fluctuation by increments are rough at best. Order-of-magnitude estimates have been made based upon the previous studies and the judgement of the power analysts. The number of units which can be justifiably installed depends not only upon fluctuating criteria, but also on such things as dependability, efficiency, unit size, and in the case of additional units, reregulating reservoir size."

"Monetary losses can be based upon the alternative thermal capacity cost of $32.38 per kilowatt, July 1977 price levels. Annual economic losses are, therefore, about $3.6 million per unit. (Since there is not an excess of peaking power, these would be real losses). To more accurately determine the power losses for each foot of change in criteria would require several weeks of effort."

Max Daily Change (feet)	Annual Peaking Power Loss Initial Four Units w/o Reregulation			Ultimate Eight Units w/Reregulation		
	Units	MW	($1,000)	Units	MW	($1,000)
[illegible]	0	0		0	0	
[illegible]	1	[illegible]	[illegible]	2	210	[illegible]
[illegible]				3	315	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	4	420	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	840	[illegible]

"[illegible]: If the [illegible] are made less stringent [illegible] [illegible] [illegible] possible [illegible] [illegible] peaking power [illegible] [illegible] [illegible] [illegible] power [illegible]. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]."

This answer contradicts the Corps' B/C analysis on additional generation. The Corps states that the annual peaking power loss from the existing four units would be 22 MW if daily fluctuations were reduced to zero. The total peaking power loss can only be equal to the entire powerhouse capacity if current operations produce only peaking power. In the B/C analysis for the four additional generators the Corps calculated benefits on the assumption that current operations with four units are used primarily for baseload generation rather than peaking power.

The assumption that presently all power is peaking power yields an unrealistically high estimate of power losses due to more stringent criteria. The alternative cost estimates for peaking power generation are higher than those for baseload generation so by calling the current operation a peaking operation the value lost due to more stringent fluctuation criteria increases.

Calling current operations baseload operations raises the B/C ratio for the additional generators. Calling current operations peaking operations increases the estimates of losses that result from more stringent fluctuation criteria. The Corps choice of assumptions regarding the existing operation (which includes [illegible] of at least 2,000 cfs and flows for peaking power of up to 30,000 cfs) seem to be selected to defend the programs favored by the Corps rather than consistently describe existing operations.

The second problem with this analysis is the assumption that if no fluctuations are permitted all generators would have to be used, i.e., 400 MW would be lost [illegible] the existing four units and 400 MW would be lost if eight units were installed. [illegible] current operations [illegible] fluctuations could be reduced to zero without [illegible] [illegible] peaking operations [illegible] [illegible] [illegible] current operations [illegible] [illegible] [illegible].

obtained minus the value of baseload power lost. Applying the same principle to fluctuations criteria which reduce peaking power leads to the result that the losses due to more stringent fluctuation criteria are the value of the peaking power lost minus the value of the baseload power gained. By failing to consider the baseload power gained by reverting to a baseload operation the Corps seriously overstated the losses due to stiffer fluctuation criteria.

The Corps' analysis is based on their assertion that "since there is not an excess of peaking power, there would be real losses." Table 6 shows that the most recent PNUCC projections show a surplus of peaking power in the West Group area for 1979-1980-79. A shortage for this year seems unlikely because the capacity of the system depends on streamflows, and is based on power available in a critically low year. This years runoff has been above average and resources available should exceed any likely loads. The Corps' claim that there is no excess is suspect and requires a better explanation.

Senator Hatfield deserves a better response than this. At the very least, the answers to his questions shouldn't contradict the assumption and methods used elsewhere in their analysis of the Libby project.

CONCLUSIONS

I. Although the Project is scheduled to be operational by 1982-83 surplus peaking capacity is projected to be available through 1989-1990. Project benefits up to 1990 would only be the value of additional system reliability and possible unidentified cost savings from other peaking power plants. These benefits are probably insignificant. The Corps defended a need for future peaking power by pointing to a present (1974) shortage. This defense of the project makes no sense because only future shortages can justify programs to supply power in the future and current shortages don't establish the likelihood of future shortages.

II. The benefit-analysis completed by the Corps was inadequate and failed to [illegible] that additional [illegible] the least [illegible] method for increasing the

peaking capacity of the PNW Power Pool.

1. A nuclear plant is an unlikely alternative to the existing operation.

2. Recreational values foregone due to the reregulating reservoir were not considered.

3. The omission of archeological costs in the B/C analysis is unacceptable.

III. The Corps' response to Senator Hatfield is inadequate, and contradicts the economic analysis done on benefits of the additional generators and reregulation.

IV. Because no likely benefits are identified for the additional capacity during the seven years following project completion it is highly probable that the benefits of a seven year project delay exceed the costs of a delay. The Corps has never done an adequate benefit cost analysis on this project. A delay is economically beneficial and gives them time to correctly analyze the real benefits and costs of their proposal. Project costs are greater than $200,000,000. A project of this magnitude merits an adequate evaluation and the project should be delayed until this evaluation is completed.

VOL.

2

ENDANGERED SPECIES

The Endangered Species Conservation Act of 1969 and the Endangered Species Act of 1973 afford protection to plant and animal species deemed by the Secretary of the Interior or the Secretary of Commerce as endangered or threatened with extinction. Section four of the latter, which became Public Law 93-205 on December 28, 1973, gives final authority for the determination of a plant or animal as an endangered species to the Secretary of the Interior.

Notification of inclusion of the bald eagle to the federal endangered species list was published in the Federal Register, Volume 43, Number 31, on February 14, 1978, pursuant to Section four of the act. Its designation as such became formal on March 16.

The bald eagle has not yet been given special designation under Montana's own endangered species provisions; however, it is anticipated that the 1979 Legislature will do so.

The recent designation of the bald eagle as an endangered species has resulted in the need to examine more closely the activities associated with the construction of the reregulating dam below Libby Dam.

Section seven of the Endangered Species Act requires a formal, interagency consultation process in the event that man-induced activities might in any way produce adverse impacts on a threatened or endangered species. It reads:

> The Secretary [of the Interior] shall review other programs administered by him and utilize such programs in furtherance of the purposes of this Act. All other Federal departments and agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of such endangered species and threatened species or result in the destruction or modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with the affected States, to be critical (Section 7, P.L. 93-205, December, 1973).

In accordance with Section seven, the U.S. Army Corps of Engineers initiated a formal consultation process with the Fish and Wildlife Service on February 21, 1978.

The Corps of Engineers requested a biological opinion regarding the impacts of construction of the proposed additional generating units and reregulating facility near Libby on the bald eagle.

The regional director of the Fish and Wildlife Service in Denver was delegated the authority of responding to the Corps' request, in this case. Following a threshold examination, acting regional director Harry Stiles issued an official response on April 20. It was concluded that insufficient information was available to permit a sound biological opinion as to whether or not the Libby Additional Units and Reregulating Dam Project "will jeopardize the continued existence of the endangered bald eagle or result in the destruction or adverse modification of its habitat" (Christophersen, personal communication). The Fish and Wildlife Service therefore requested the Corps of Engineers to provide the following information:

1. The number of eagles that winter on the Kootenai River from Kootenai River from Libby to Libby Dam, broken down by river sections as follows:

    a. Libby Dam to Fisher River
    b. Fisher River to the reregulating dam site
    c. The reregulating dam site to the Zonolite plant
    d. The Zonolite plant to Libby

2. The dates when eagles first appear in the area, when their numbers peak and when they leave the area

3. Nesting locations for eagles that winter on the Kootenai River, if available from existing sources

4. Observation of hunting techniques and food habits, to determine the relative importance of the following items in the eagles diet:

    a. dead or stunned fish which pass downstream through Libby Dam
    b. migrating whitefish and other free-swimming fish
    c. big game carrion
    d. waterfowl

5. Location of present hunting perch sites, and present roosting areas

6. Location of potential alternative perch sites above the level of the rereg pool (2100 foot elevation)

7. Location of present or potential winter habitat components below the pro-

posed reregulating dam, downstream to Libby, including:

a. perching sites
b. roosting sites
c. islands
d. river bars
e. gravel bars
f. spawning habitat for fall-spawning fish

(Information provided by the Billings area office of the U.S. Fish and Wildlife Service: personal communication with Mr. Dennis Christopherson).

In response to the request for additional information, the Corps recently contracted with Dr. John Craighead, Missoula, to perform studies at the site and provide the information. Dr. Craighead has said that results should be available in April or May, 1979. Upon receipt of that information, the Fish and Wildlife Service will submit its biological opinion to the Corps within 60 days (Thompson, personal communication), thus apparently completing the formal consultation process for the Libby rereg project.

A possible dilemma has developed.

The federal regulations that establish procedures for interagency consultation in accordance with Section seven of the Endangered Species Act of 1973, specifically Part 402, Chapter IV, Title 50 of the Code of Federal Regulations, states:

> "Until consultation has been completed and a biological opinion issued, good faith consultation shall preclude a Federal agency from making an irreversible or irretrievable commitment of resources which would foreclose the consideration of modifications or alternatives to the identified activity or program."

In spite of the obviously unsettled nature of the formal consultation process, the Corps of Engineers sought to begin construction activities that are directly related to the reregulation dam project. A request was submitted to acting regional director Stiles of the Fish and Wildlife Service to consider construction of the haul bridge as an activity separate from all other scheduled construction activities. In brief, Mr. Stiles concluded that construction of the haul bridge alone would probably have minimal impact on the bald eagle or its habitat (Christopherson, personal communication). The requirements of Section 404 of the Federal Water Pollution Control Act were then met and work on the haul bridge began following a 51-day delay of the reg-

ular construction schedule (Fauss, personal communication).

The haul bridge will be a temporary structure with the single purpose of allowing for the transport of fill material, personnel and supplies needed for construction of the reregulating facility. Its cost to taxpayers will be slightly in excess of $1½ million (Conde, personal communication).

The Corps' construction scehdule calls for the beginning of railroad relocation work in the fall of 1978 (Fauss, personal communication). Much of this work will necessitate the clearing of timbered areas. However, according to the minutes of the last meeting of the Libby Reregulating Dam Environmental Coordinating Committee, May 9, 1977, the U.S. Forest Service has delayed the removal of timber from the area to be affected by the project until all necessary information is provided on the possible adverse impacts to eagles.

Design Memorandum No. 5 for the Libby Additional Units and Reregulating Dam Project had provided for selected trees in an area near the Fisher River to be left standing and for the erection of "a limited number of poles" in other areas along the proposed reservoir. These proposed actions were intended to minimize the impact of the project on the bald eagle. However, in the opinion of the Fish and Wildlife Service, trees or poles above elevation 2130, as proposed in the design memorandum, would be too far away from the river to be effective (Rounds, 1977).

To what extent the Corps of Engineers will attempt to carry out other activities related to the construction of additional generating units and the reregulating facility is speculation at this point. The decision to proceed with the haul bridge is an indication that a piecemeal approach may be imminent. Such an approach is, in our opinion, in conflict with the intent of the Endangered Species Act and that portion of the Code of Federal Regulations which establishes procedures for good faith interagency consultation before an irreversible or irretrievable commitment of resources is made.

SOURCES

(7) United States Department of the Interior. Federal Register, volume 41, number 31. February 14, 1976.

(6) United States Congress. Public Law 93-205, the Endangered Species Act. December 28, 1973.

(2) Christopherson, J. 1978. Wildlife biologist. United States Fish and Wildlife Service, Billings area office, Billings, Montana.

(5) Thompson, J. 1978. Biologist, United States Army Corps of Engineers, Seattle District, Seattle, Washington.

(3) Fuss, R. 1978. Resident engineer, United States Army Corps of Engineers, Libby dam project, Libby, Montana.

(1) Bonde, T. 1978. Resident biologist, United States Army Corps of Engineers, Libby dam project, Libby, Montana.

(4) Rounds, B. 1977. Acting area manager, United States Fish and Wildlife Service, Billings area office, Billings, Montana.

ATTACHMENTS

Letter to Col. J.A. Poteat, District Engineer, U.S. Army Corps of Engineers, Seattle District; from R.W. Sallin, Acting Area Manager, U.S. Fish and Wildlife Service, Billings Area Office; April 21, 1975.

Public Law 93-205, The Endangered Species Act of 1973, December 28, 1973.

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Billings Area Office
Federal Building, Room 3035
316 North 26th Street
Billings, Montana 59101

April 21, 1978

Colonel John A. Poteat
U.S. Army District, Seattle
Corps of Engineers
P.O. Box C-3755
Seattle, WA 98124

Dear Colonel Poteat:

This letter responds to your request that we withdraw our objection to the "haul bridge" portion of the work proposed in Public Notice NPSOP - RF-77-9 (October 27, 1977). That Notice outlines work proposed to be conducted by the Corps of Engineers in conformance with Section 404 of the Federal Water Pollution Control Act.

We originally commented on the Notice in a letter to you dated November 28, 1977. In that letter, we indicated concerns about a number of matters, based on review of the Notice, and requested that the work outlined in the Notice be held in abeyance until the issues identified could be resolved.

We hereby reiterate that request. However, none of the concerns expressed in our November 28 letter relate specifically to construction of the haul bridge. That is, no significant impacts on fish and wildlife were expected from that specific construction activity. Your request that we consider the haul bridge separately was, however, delayed by your February 22, 1978, initiation of formal consultation with respect to the bald eagle under Section 7 of the Endangered Species Act of 1973.

On April 20, 1978, Acting Regional Director Harry Stiles issued an official response to your request for formal consultation on the bald eagle. That response concluded, among other things, that, "Construction of the proposed haul bridge approximately 1.5 miles upstream (river mile 110) from the reregulating dam site would have minimal impact on the eagle and its habitat." It also stated "While the haul bridge in itself would not impact the eagle or its habitat, subsequent aspects of the project may have detrimental effects."

Based on the foregoing, we conclude that there is no reason to object to consideration of the haul bridge as a separate action for Section 7 purposes. We also reiterate our previously stated opinion that construction of the bridge will not significantly impact fish and wildlife resources if normal and reasonable precautions are observed during actual construction.

We did, however, note that Regulations establishing procedures for interagency consultation pursuant to Section 7 (Part 402, Chapter IV, Title 50, Code of Federal Regulations) states: "Until consultation has been completed (a biological opinion issued, and formal consultation terminated), a Federal agency shall not make any irreversible or irretrievable commitment of resources which would foreclose the consideration of modifications or alternatives to the identified activity or program." We wish to observe again that formal consultation on the Libby Additional Units and Reregulating Dam Project will not be completed until a biological opinion has been issued as outlined in Acting Regional Director Stiles' April 20 threshold response. In that connection, it must be recognized that any decision to proceed with the haul bridge prior to completion of formal consultation on the entire project involves the risk that the biological opinion may conclude there will be adverse impacts on said species or their habitat after construction has begun on a component of the project.

Sincerely,

/S/ Robert M. Ballou

Robert M. Ballou
Acting Area Manager

cc: Regional Director, USFWS, Denver, CO (ENV)
Director, Montana Fish and Game Department

VOL

3

LOV

E

FLUCTUATION CRITERIA AND DISCHARGE LIMITS

Presently, operation of the four 105 megawatt generators in Libby Dam is restricted by the following discharge limits and maximum fluctuation criteria:

a. A minimum instantaneous discharge of 2000 cfs
b. maximum fluctuations of one foot per hour, four feet per day, May through September: two feet per hour, six feet per day, October through April. (U.S. Army Corps of Engineers, 1970)

According to representatives of the Corps of Engineers (Shannon, Thompson, personal communication), those fluctuation criteria and discharge limits were established following consultations with the Bonneville Power Administration, the U.S. Fish and Wildlife Service and the Montana Department of Fish and Game. The criteria are admittedly a compromise (Poteat, 1976).

Originally, the Fish and Wildlife Service, in concurrence with the Department of Fish and Game, recommended the following discharge limits and maximum fluctuation criteria:

a. a sustained flow in the Kootenai River of not less than 2500 cfs (as measured at the dam).
b. a rate of change of water releases should be made as gradually as possible and should not exceed 1 foot per hour as measured at a point just upstream from the confluence of the Fisher River. (U.S. Fish and Wildlife Service, 1965)

These recommended criteria, according to the Fish and Wildlife Servie, were intended to minimizethe detrimented effects to aquatic organisms, as well as decrease hazards to anglers.

The Department of Fish and Game and the Fish and Wildlife Service concluded later, in 1975, that a minimum discharge limit of 2000 cfs would be adequate for short periods. They stipulated, however, a minimum operational flow of at least 3000 cfs would be more preferable and that special consideration should be given to providing at least 4000 cfs during the periods of April through June and October through November to insure that spawning gravels would remain inundated. Their conclusions were based on instream flow requirements studies completed in 1974 (Christopherson, personal communication).

The criteria originally submitted by the Bonneville Power Administration would be

of considerable interest and value to this issue; however, no attempt has been made to obtain them. Precisely that kind of information will presumably be made available when the Corps responds to Senator Paul Hatfield's letter of May 30, 1978. Among other requests for information regarding the proposed reregulating facility, Senator Hatfield requested the Corps to explain when and how the maximum allowable fluctuation criteria were established. As of June 11, the Corps had not yet responded but was nearing completion of its reply (Thompson, personal communication). Our request to the Corps for similar information was denied on the grounds that the release of such information to the state might in some way affect pending litigation (Redfield, personal communication). We are therefore hoping that Senator Hatfield will supply the state with that information as soon as it becomes available.

Historically, the Kootenai River was a typical mountain river. Melting snowpack would result in high spring flows, generally reaching a maximum in late May or June. Low flows were reached in late July or August and remained somewhat constant throughout the fall and winter. In Montana, the Kootenai followed a free-flowing, mildly meandering course through a heavily timbered valley. The river's average width was approximately 500 feet. During periods of low flow, a denuded bank approximately 10 feet high was evident--the result of annual spring runoff. However, the runoff rarely exceeded the confines of the river channel (U.S. Army Corps of Engineers, 1974).

Streamflow records for the Kootenai River are available from 1911 through the present. The average annual discharge, as measured at Libby before impoundment was 10,970 cfs. The maximum recorded discharge was 121,000 cfs on June 21, 1916. The minimum was 995 cfs on January 11, 1960. The average channel velocities were approximately 3 f/s for flows near 4000 cfs, 4 f/s for flows near 10,000 cfs and 10 f/s for flows near 100,000 cfs (U.S. Army Corps of Engineers, 1974).

Regulation of the outflow through Libby Dam has, of course, changed the seasonal flow pattern. In fact, a reversal of the natural flow regime is inherent in peaking operations and such a reversal has occurred below Libby Dam. That present operation of the dam without the benefit of a reregulating reservoir [illegible] may be uneconomical and in violation of earlier agreements. In any case, the

first two years of Libby Dam's operation resulted in numerous violations of these criteria established by the Corps (Christenson, personal communication). Verification of these violations has been requested from the U.S.Geological Survey. Such violations during the shakedown period might not be simply an unavoidable fact of life, but it would be of value to this issue to hear the Corps' response.

With reregulating capabilities, it is estimated that downstream flows during the period of November through March will be about 15,000 cfs higher than historical flows for the same period. This is necessary as Lake Koocanusa is drawn down for both power production and providing space for storing spring runoff. From late March through most of April, discharges will approximate historical flows for the same period. During May and June, the regulated flow will be approximately 36,000 cfs less than the average natural flow for the same period. With Lake Koocanusa filled each year by July, the regulated flow during July, August, September, and October should approximate the average natural flow for the same period (U.S. Army Corps of Engineers, 1974).

Discharges from the main dam into the reregulating reservoir will be determined largely by power generation schedules. With eight 105 megawatt generators in the main dam operating for peaking power production, these discharges will vary from a low of less than 1000 cfs to as much as 50,000 cfs. Historically, a flow of 50,000 cfs had a statistical probability of occurring once in 100 years, whereas up to 40,000 cfs will be released routinely into the reregulating reservoir (U.S. Army Corps of Engineers, 1974).

Releases from the proposed reregulating dam will apparently conform to those criteria established by the Corps, now in effect below the main dam. As stated previously, those criteria include a minimum discharge limit of 2000 cfs; however, there are some obvious problems and inconsistencies associated with them.

The Corps has stated on numerous occasions, both orally and in writing, that flows below 4000 cfs will occur infrequently or in emergency situations only (see attached letter, [illegible], 1977). And, in the Design Memorandum 50, the Corps stated that a minimum flow of approximately [illegible] cfs will be considered below the reregulating dam during the summer months in order to maintain the aesthetic value of Kootenai Falls.

Yet, in the same document, water release from the proposed reregulation dam during the summer is characterized in terms of being reduced from 46,000 cfs to 2,000 cfs in 19 hours 45 minutes (U.S. Army Corps of Engineers, 1976).

Furthermore, in an invitation for bids for Phase I of reservoir clearing, a revised minimum discharge limit of 1500 cfs was recently introduced by the Corps (Libby Additional Units and Reregulating Dam Project, Reservoir Clearing Phase I, page [illegible], Part II, Technical Provisions). The Fish and Wildlife Service questioned the revised limit, having received no forewarning (Rounds, 1978) and the issue was raised again at the last meeting of the Environmental Coordinating Committee, May 9, 1978. No response has yet been given to Mr. Rounds' comments (Christopherson, personal communication), nor was any Corps representative able to offer an explanation on May 9. The intent or validity of 1500 cfs as a newly established discharge limit is simply not known, but it is vital to this issue.

Throughout the Corps' planning process for additional generating units and reregulation at Libby Dam, a general fear has been felt that the reregulating dam and reservoir will not be used primarily for smoothing out the wild fluctuations caused by peaking operations. The Corps has attempted to allay this and other fears on numerous occasions and has responded to countless inquiries into its operating assumptions; however, the fears have not been allayed and questions continue to arise. Senator Hatfield's recent letters to the Governor of Montana and the Corps bear witness to these doubts (letters attached).

The adequacy of the existing minimum discharge limit and maximum fluctuation criteria--from both an operational and environmental viewpoint--is unsettled. Within the last month, the Department of Fish and Game, based on experiences to date with fluctuations below Libby Dam, has revised its recommendation regarding maximum fluctuations and minimum discharge limits. Prompted by Senator Hatfield's query "Is Montana satisfied with the criteria?" the Department of Fish and Game has recommended:

1. fluctuations not in excess of three feet per day, one-half foot per hour, year around
2. a minimum instantaneous discharge of 4000 cfs
3. a steady flow three hours [illegible] and a steady flow during [illegible] through October.

(Recommendations provided by the Montana Department of Fish and Game, July, 1977).

The third recommendation (c) is made to accommodate fishermen. The second (b) is particularly important during the periods of April through June and October through November as they represent the spawning periods of the most abundant fishes in the river and it is believed that continuous flows of at least 4000 cfs will ensure protection of spawning beds (Whitney, personal communication).

Clearly, there is a need to consider operating Libby Dam, with or without reregulation, in a manner that protects the downstream aquatic environment and based on the best available information. If the maximization of power benefits is constrained by environmental limitations, then it should be shown what is being lost, in both cases, by incremental trade-offs. The loss of power benefits is more easily quantified than environmental losses, but, to date, the absence of an attempt to compare these two values in this way is probably largely responsible for many of the unanswered questions and fears.

The timing of fluctuations is as important as the magnitude of those fluctuations--perhaps more important. The Corps has given assurances that the reregulating dam, whether equipped with generators or not, will permit peaking operations and that the resulting fluctuations below the reregulating dam will conform to the established criteria. On the other hand, no indication has apparently been given by the Corps regarding the frequency with which the maximum fluctuation or minimum discharge limits will be attained by incorporating power into the reregulating dam. The terms "infrequently" and "emergency situations" do not adequately define frequency limitations. It is feared that emergency situations could arise in a peaking operation every week and be a week-end in duration.

The State of Montana will not endorse maximum fluctuation criteria and minimum discharge limits that are, in fact, compromised criteria.

SOURCES

1. Christopherson, S. 1978. Wildlife biologist, United States Fish and Wildlife Service, Billings Area Office, Billings, Montana. (personal communication).

2. Foteat, J. 1976. District engineer, United States Army Corps of Engineers, Seattle District, Seattle, Washington. (letter to B.W. Rounds, December [illegible], 1976).

3. Foteat, J. 1977. District engineer, United States Army Corps of Engineers, Seattle District, Seattle, Washington. (letter to H. Willoughby, August 10, 1977).

4. Redfield, M. 1978. Attorney, United States Army Corps of Engineers, Seattle District, Seattle, Washington. (personal communication).

5. Rounds, B. 1978. Acting area manager, United States Fish and Wildlife Service, Billings Area Office, Billings, Montana. (letter to Col. J. A. Foteat, May [illegible], 1978).

6. Shannon, L. 1978. Project manager, Libby Dam project, United States Army Corps of Engineers, Seattle District, Seattle, Washington. (personal communication).

7. Thompson, J. 1978. Biologist, Libby Dam project, United States Army Corps of Engineers, Seattle District, Seattle, Washington. (personal communication).

8. United States Army Corps of Engineers, Seattle District. Design Memorandum 30, reregulating dam and reservoir site selection and land requirement plan. January, 1970.

9. United States Army Corps of Engineers, Seattle District. Libby Additional Units and Reregulating Dam, Design Memorandum 1, general design memorandum, phase I, plan formulation. August, 1974.

10. United States Army Corps of Engineers, Seattle District. Libby Additional Units and Reregulating Dam project, Design Memorandum 5, phase I, part II, technical provisions, reservoir clearing. November, 1977.

11. United States Department of the Interior, Fish and Wildlife Service. A detailed report on fish and wildlife resources affected by Libbt dam and reservoir project, Kootenai River, Montana. February, 1965.

12. Whitney, A. 1978. Administrator, Fisheries Division, Montana Department of Fish and Game, Helena, Montana. (personal communication).

ATTACHMENTS

Letter to Col. R.J. Eineigl, District Engineer, U.S. Army Corps of Engineers, Seattle District; from D.W. Rounds, Area Manager, U.S. Fish and Wildlife Service, Billings Area Office, Billings, Montana; October [illegible].

Letter to D.W. Rounds, Area Manager, U.S. Fish and Wildlife Service, Billings Area Office; from Col. J.A. Poteat, District Engineer, U.S. Army Corps of Engineers, Seattle District, Seattle, Washington; December [illegible], 1977.

Letter to H. Willoughby, U.S. Fish and Wildlife Service, Denver Regional Office; from Col. J.A. Poteat, District Engineer, U.S. Army Corps of Engineers, Seattle District, Seattle, Washington; August 10, 1977.

Letter to Governor Thomas L. Judge from Senator Paul Hatfield; May 30, 1978.

Letter to Lt. Gen. J.W. Morris, Chief, U.S. Army Corps of Engineers; from Senator Paul Hatfield; May 30, 1978.

Letter to Gary Fritz, Chief, Water Planning Bureau, Montana Department of Natural Resources and Conservation; from J. Murphy, Chief, Open Cut Bureau, Montana Department of State Lands; July 14, 1978.

Letter to Scott Brown, Environmental Planner, Montana Department of Natural Resources and Conservation; from A. Whitney, Administrator, Fisheries Division, Montana Department of Fish and Game; July 17, 1978.

List of known violations of established maximum fluctuation and minimum discharge limits at Libby Dam, October 1, 1974 to August 4, 1976 (unverified).

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
[illegible]
Billings, Montana [illegible]

IN REPLY REFER TO: ES

December 1, 1978

Colonel [illegible]
District Engineer
Seattle District, Corps of Engineers
4735 East Marginal Way South
Seattle, WA 98134

Dear Colonel [illegible]:

The U.S. Fish and Wildlife Service addressed the subject of the proposed addition of power generating facilities to the Libby Reregulating Dam in correspondence to your agency dated January 16, 1978. Our comments were based on review of documents provided by you. These included the summary report of the Board of Engineers for Rivers and Harbors (BERH) and the Environmental Impact Statement entitled "Libby Reregulating Dam and Lake - At Site Power, Kootenai River, Montana."

The purpose of our review of these documents was to determine what, if any, effect the proposed power additions would have on downstream flow fluctuations. We found that both documents clearly stated that no impact on downstream river fluctuations would occur, because reservoir operations would be the same "with or without power generating facilities in the reregulating dam." Corps of Engineers planning officials also assured us on several occasions that the proposed power additions would not alter reservoir operations and that projected maximum (or near maximum) river fluctuations [illegible] under Libby flow patterns would occur only during "critical power emergencies." These "emergencies" were said to be expected quite infrequently. As a result, we did not object to the addition of power generating facilities in the reregulating dam. [illegible]

[illegible]

provided to [illegible] [illegible] will. The [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] reservoir fluctuations [illegible] to [illegible] in [illegible] flow [illegible] resulting from changes in [illegible] [illegible] [illegible] [illegible]. [illegible] conditions [illegible] downstream under this proposal appear significantly different from those originally reviewed by us.

It also appears from our review of Plate 21, Hourly Load Distribution [illegible] [illegible] [illegible] flow conditions [illegible] the original [illegible] [illegible], to minimize downstream flow fluctuations, has been altered in order to maximize power benefits. Under the new operating procedures, flow conditions below the reregulation dam would, at times, actually exceed fluctuations occurring at Libby Dam. Although the resulting flow fluctuations would be within the limits of established criteria, the conditions illustrated would result in the stream environment being subjected to additional abuse (fluctuations).

The reregulation dam, which was originally planned to lessen the impacts of upstream power generation facilities, may now contribute to the problem. As you are aware, the U.S. Fish and Wildlife Service was not informed of nor given the opportunity to comment on these changes prior to completion of the Phase I design memorandum. As a result of these changes, the U.S. Fish and Wildlife Service is reassessing the effects of the proposed power additions at Libby Reregulating Dam. To fully evaluate what impacts the enlarged power additions may have on the environment of the Kootenai River will require that we have some idea of how often, of what magnitude, and of what duration conditions similar to those illustrated in Plate 21 would occur. Any additional information you can provide on this matter would be appreciated.

Sincerely,

/S/ Burton W. Rounds

Burton W. Rounds
Area Manager

cc: Montana Fish & Game, Helena, MT
Regional Director, Denver, CO

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX C-3755
SEATTLE, WASHINGTON 98124

NPSEN-PL-ER [illegible]

[illegible]

Mr. [illegible]
U.S. Fish and Wildlife Service
711 Central Avenue
Billings, Montana 591[illegible]

Dear Mr. [illegible]:

This will acknowledge your letter of 1 December 1976 and confirm information provided in subsequent phone calls and at the interagency meeting on 9 December 1976 regarding coordination of fish and wildlife concerns at Libby project, Libby, Montana.

Considerable discussion has taken place regarding flow fluctuations and minimum discharge conditions at the Libby reregulating dam. This discussion culminated in our 9 December 1976 meeting where there was an excellent exchange of information. A copy of the memorandum discussing the results of that meeting is enclosed for your information (enclosure 1). Please advise us if you have any comments on that memorandum. We [illegible] most of your questions were answered [illegible] with much [illegible] information on the [illegible] and magnitude of flow fluctuations. [illegible] listed: (1) the [illegible] operational conditions [illegible], (2) [illegible] the Libby [illegible] [illegible]

NPSEN-PL-ER [illegible]
Mr. [illegible]

[illegible] Columbia River [illegible] the total Columbia River system. To [illegible] in the [illegible] expected during that month, the [illegible] was instructed to maintain a minimum flow of 3,000 [illegible] during that period. During that period the [illegible] about a [illegible] The [illegible] The operation [illegible] was not a typical operation.

Representatives from Montana Department of Fish and Game (MDF&G) and [illegible] in various meetings and correspondence have recommended that in operating the reregulating dam, major emphasis should be placed upon providing suitable [illegible] downstream of the project with little consideration given to stabilizing the reservoir. [illegible] that the reservoir will provide [illegible] natural [illegible] We concur with this recommendation [illegible] greater flexibility in operation of the [illegible] greater flexibility in [illegible] as much as [illegible]

Libby Dam and [illegible] MDF&G, [illegible] concern recently [illegible] on the [illegible] which [illegible] anticipated [illegible] On 8 December 1976 [illegible] of the [illegible] I have [illegible] Chairman of the [illegible] Committee of the Libby [illegible] Gun Club [illegible]

[illegible]
[illegible]

[illegible] concerns [illegible] will provide guidance in our [illegible].

I trust that the coordination accomplished at the 4 December 1979 meeting, plus the information presented in this letter, will result in the withdrawal of your reservations on the addition of [illegible] units to the Libby Reregulating Dam and that you will so advise your Washington office.

If you still have reservations on this matter, we request the opportunity to meet for further discussion as soon as practicable. Please contact Mr. Larry Shannon, Libby Project Manager, at FTS telephone [illegible]-3455 or myself at FTS telephone [illegible].

Sincerely yours,

[illegible]

[illegible]

Copy furnished with inclosure:
State of Montana
Department of Fish and Game
1420 East Sixth Avenue
Helena, Montana [illegible]

DEPARTMENT OF THE ARMY
[illegible]
[illegible]
[illegible]

[illegible]

[illegible]
[illegible]
[illegible]
Denver, Colorado [illegible]

Dear Mr. Willoughby:

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

JOHN C. STENNIS, MISS., CHAIRMAN

HENRY M. JACKSON, WASH.
HOWARD W. CANNON, NEV.
THOMAS J. MC INTYRE, N.H.
HARRY F. BYRD, JR., VA.
SAM NUNN, GA.
JOHN C. CULVER, IOWA
GARY HART, COLO.
ROBERT MORGAN, N.C.
WENDELL R. ANDERSON, MINN.
PAUL HATFIELD, MONT.

JOHN TOWER, TEX.
STROM THURMOND, S.C.
BARRY GOLDWATER, ARIZ.
WILLIAM L. SCOTT, VA.
DEWEY F. BARTLETT, OKLA.
JESSE HELMS, N.C.
JAKE GARN, UTAH

FRANCIS J. SULLIVAN, STAFF DIRECTOR

United States Senate
COMMITTEE ON ARMED SERVICES
WASHINGTON, D.C. 20510

May 30, 1978

The Honorable Thomas L. Judge
Governor of the State of Montana
State Capitol
Helena, Montana 59601

Dear Governor Judge:

Enclosed is a lengthy, self-explanatory letter which I have written to the Corps of Engineers regarding the operating criteria set for Libby Dam.

Two items are central to the Corps' arguments for its current policy: a provable need for peaking power now, and assurances that downstream fluctuations will not detract from traditional uses, such as recreation and aquatic habitat.

The first item will be answered by the Corps. I have written to the Department of the Interior asking for comments by pertinent agencies. I would appreciate the comments from the State of Montana as well.

Montana's experts are uniquely qualified to assess the impact of the fluctuations of the Kootenai River on recreation and aquatic life. My files on Montana's participation in setting the "maximum allowable criteria" are sketchy. I am interested not only in the State's past comments but in its current views as well. Is Montana satisfied with the criteria? If it were to start from scratch, which fluctuation limits would it recommend? Also, does the State intend to play a role in the permit process when the Corps files application with the Federal Energy Regulatory Commission to construct the reregulation dam?

The Honorable Thomas L. Foley
May 17, 1978
Page Two

I would appreciate your comments, or those of your Department Counsel, on any of the legal questions in my letter to the Corps.

Very truly yours,

[illegible], M.C.

Enclosure

JOHN C. STENNIS, MISS., CHAIRMAN
HENRY M. JACKSON, WASH.
HOWARD W. CANNON, NEV.
HARRY F. BYRD, JR., VA.
SAM NUNN, GA.
JOHN C. CULVER, IOWA
GARY HART, COLO.
ROBERT MORGAN, N.C.
WENDELL R. ANDERSON, MINN.
PAUL HATFIELD, MONT.
JOHN TOWER, TEX.
STROM THURMOND, S.C.
BARRY GOLDWATER, ARIZ.
WILLIAM L. SCOTT, VA.
DEWEY F. BARTLETT, OKLA.
JESSE HELMS, N.C.
JAKE GARN, UTAH
FRANCIS J. SULLIVAN, STAFF DIRECTOR

United States Senate
COMMITTEE ON ARMED SERVICES
WASHINGTON, D.C. 20510

May 30, 1978

Lieutenant General John W. Morris
Chief. Corps of Engineers
Department of the Army
Room 1230, Building T-7
Washington, D.C. 20314

Dear General Morris:

Since taking office in January of this year, I have heard from many Montanans regarding the downstream fluctuation limits set for Libby Dam.

According to the Corps, fluctuation below the reregulating dam will be held to no more than 1 foot per hour or 4 feet per day from May to September, and no more than 1 foot per half hour or 6 feet per day from October to April. Assurance is given that the variations will be held to about half the maximum allowable criteria, if possible.

Assurances notwithstanding, recreational users of the river question both the extent of the fluctuation and the procedure by which the limits were set. In researching the documents associated with construction of Libby Dam, I am unable to answer their questions.

Please correct me if I am wrong, but it would appear that the definition of a reregulating dam is being changed by events at Libby. Traditionally, the prime function of a reregulation dam has been to take the sudden discharges from a main dam, absorb the wild fluctuations, and release the water at a steady rate. In short, the principal traditional aim of a reregulation dam has been to smooth out variations produced by power generation, and only incidentally to add to generating capacity.

At issue is the use of all eight generators of the dam for peaking capacity. The Libby Dam project was planned to proceed in three stages: (1) construction of the dam with the first four generators, (2) installation of the remaining four generators coupled with construction of the reregulating dam [illegible], and finally, (3) installation of three smaller generators at the reregulation dam.

Some have alleged that the first four generators were designed to produce power at a steady rate, while the reregulation dam was necessary to handle the surges of peaking power produced by the second four turbines. As I review appropriations statements by my predecessors, Senators Mike Mansfield and Lee Metcalf, I find that to be their impression, too. Specific reference is made to the added mission of the second four generators to handle peaking capacity. By implication, the mission of the first four generators appeared designed to provide base-load power.

Documents accompanying the authorization of the Libby Dam are silent on the fluctuation issue. Somewhere between the beginning of the project and now, the words "maximum allowable criteria" appeared and the fluctuation limits described above were stated. In addition, the first four turbines were set in motion -- not as steady base load generators but as peaking units, contributing to daily fluctuations downstream from the main dam.

I am receiving considerable mail on the reregulation dam and fluctuation issue. A common theme is the charge that the people were misled -- that the Corps was to get the dam and use of the upper half of the river, but that the lower half would be returned to the traditional users. They further charge that the use of the first four turbines for peaking violates an earlier public understanding, that the fluctuation criteria is excessive and was arrived at without the [illegible] understanding or participation of the public, and that the uncertainties caused by fluctuations in the lower portion of the river discourage a good many [illegible] people from enjoying the river. Finally, they charge the [illegible] [illegible] of the [illegible] [illegible] and [illegible] [illegible] [illegible] [illegible]. [illegible] that the fluctuations will [illegible] [illegible] in the lower Kootenai.

Mr. Donald F. [illegible]
May [illegible], [illegible]
Page Three

In order to respond to these allegations, I would appreciate your answers to the following questions or problems:

I. What is your position on the claim that the first four turbines were not originally [illegible] [illegible] [illegible] between the functions of the first and second sets of turbines, why then must we [illegible] [illegible] [illegible] Congress? Why is construction of the [illegible] expressly coupled with installation of the second set of turbines?

How do you respond to the claim that [illegible] in their annual [illegible] testimony [illegible] (pumpback) [illegible] expressly [illegible] construction of the [illegible] pumping from the second four generators? If they were operating under an illusion, why did not the Corps attempt to correct that illusion? Do you believe the Corps had such an obligation?

II. Precisely when and how were the [illegible] [illegible] did the [illegible] express provision for pumping power from the first four turbines? Please explain the [illegible] which you [illegible] to the Federal Power Commission when [illegible] a license for the [illegible]. What was your claim? What did the FPC [illegible]? [illegible] in your application and in the [illegible] was [illegible] by the FPC?

III. [illegible] you [illegible] Do you have [illegible] of [illegible] from the [illegible] [illegible] in that area.

IV. How do you [illegible] that the [illegible] [illegible] Do you believe [illegible] now [illegible]

peaking surges emanating from the first four turbines of the main dam. How does that square with the apparent belief of Members of Congress and the public that "reregulation" means reregulating back to prior stream conditions (or as close as practicable) and not to artificial interim conditions? Is the public impression -- of reregulating to prior conditions -- an erroneous interpretation of the meaning of "reregulating"?

V. Why is peaking power needed from Libby's first four turbines? According to some observers, the Northwest has never been short of peaking power. There is excess peaking capacity at some dams. I am informed that the California Energy Commission is requesting to buy an additional 3,600 megawatts of peaking power from BPA, and that the request is likely to be granted. If the BPA is seriously considering the sale, can it be said that the Northwest is short of peaking power?

VI. The maximum allowable criteria for stream flows in the winter is six feet of fluctuation per day. I would appreciate an analysis of total power production at the regulation criteria of six feet, then one-foot increments down to zero, or the practical minimum. Put another way, how much total power would be lost if the fluctuations were gradually scaled back to negligible amounts? What are you really losing?

Any protest that total power figures are misleading should be set in the context of your answer about adequacy of peaking power supplies in the Northwest. I.e., if peaking power is in excess, can it be "lost"?

VII. How would you characterize the acceptance by Federal and Montana recreation officials of the "maximum allowable criteria"? My files are very sketchy on this point, but the quotations I have do indicate some misgivings. I would appreciate your frank response on this. I will also be writing to those officials asking for comment.

I realize that Libby Dam is a major undertaking, and the conditions set for its operations will have impact on the people of Northwestern Montana for a long time.

[illegible]
[illegible]
[illegible]

Therefore, at [illegible] on [illegible]. I would appreciate [illegible] this letter [illegible] you, [illegible] the President on the [illegible]. Additional comments you may have will, of course, be welcome.

I thank you for your support in this important matter.

Very truly yours,

Paul [illegible], U.S.S.

STATE OF MONTANA

DEPARTMENT OF STATE LANDS

MAILING ADDRESS: CAPITOL STATION
OFFICE: 1625 11TH AVENUE
HELENA 59601
[illegible]

STATE BOARD OF
LAND COMMISSIONERS
THOMAS L. JUDGE
GOVERNOR
GEORGIA RICE
SUPT. OF PUBLIC INSTRUCTION
FRANK MURRAY
SECRETARY OF STATE
MIKE GREELY
ATTORNEY GENERAL
E. V. "SONNY" OMHOLT
AUDITOR

LEO BERRY, JR.
COMMISSIONER

July 14, 1978

Gary Fritz, Chief
Water Planning Bureau
Department of Natural Resources & Conservation
32 South Ewing
Helena, Montana 59601

Re: Libby Rereg Project

Dear Gary,

Following our meeting of July 6, 1978, I have had a chance to review our files and reflect on the various subjects discussed during that meeting.

My comments and recommendations are as follows:

1) Flucuations

In my opinion the Libby Additional Units and Reregulating Dam EIS (or any other Corps document) does not adequately assess the anticipated flucuations below the rereg dam.

Perhaps the state should approach the Corps with the idea that they issue a supplement to the EIS or a new design memorandum that thoroughly discusses, illustrates and describes the expected or anticipated flucuations downstream of the rereg dam. Terms like "frequent" and "rare" must be defined and held within limits. I think the Corps should diagram or graph the clucuations for the following events:

i) daily
ii) weekly
iii) monthly
iv) seasonal (summer, fall, winter, spring)
v) typical 3 day weekends (example July 4th and Washington's birthday - Feb. [illegible] or whatever)
vi) Items 1 thru 5 [illegible] if all 8 units at Libby are operated as base-load units
vii) Items 1 thru 5 above if all 8 units at Libby are operated as peaking units
viii) Items 1 thru 5 above if [illegible] units are operated as base-load [illegible] units.
ix) All of the above with fewer units installed in the [illegible].
x) All of the above [illegible] in the years [illegible] the [illegible].

In my opinion the [illegible] has [illegible] mitigated [illegible] regarding the frequency and [illegible] [illegible] [illegible].

The [illegible] should [illegible] concerning the establishment of minimum flows and [illegible] channels.

1) Mitigation

It has yet to be demonstrated, it is based on my experience, that the mitigation [illegible] and [illegible] land near Eureka for Libby Dam are also commensurate for the [illegible] project. This is simply unrealistic and ridiculous. The state of Montana should do everything possible short of declaring war to ensure that the state receives just compensation and mitigation for the impacts on wildlife [illegible] by the [illegible] project. I believe the above noted mitigation [illegible] provides for the impacts created by Libby Dam. The Corps is now trying to extend coverage to the [illegible] project which clearly demonstrates their significant lack of concern for wildlife resources. The state should approach the Corps and the Congress to review the "authorized" mitigations for the projects.

2) Endangered Species

In light of the recent Tellico decision by the U.S. Supreme Court the Seattle District [illegible] continues to spend public funds on a project that may be terminated by the Endangered Species Act. This, in my opinion, is truly irresponsible of any government agency. I believe the Endangered Species Act prohibits the commitment of irretrievable and irreversible resources towards a project until formal consultation regarding an endangered species is completed and a final determination reached. I realize that the USFWS has stated that the area near the proposed [illegible] bridge is not considered detrimental or "critical" to the continued existence of the bald eagle. However, this does not excuse the Corps from [illegible] commitments and irretrievable funds towards the project as a whole. What good is the [illegible] [illegible]? [illegible] [illegible] [illegible] should take a position requesting that all work on the project cease immediately until a final determination is made concerning [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] the state.

4) Downstream effects of Libby Dam

Since construction of Libby Dam the Kootenai River has had its ability to do work (i.e. transport sediment or bed load materials) drastically reduced. This in turn has created numerous problems downstream. Tributary streams to the Kootenai such as Lake, Callahan, Libby, Parmenter and Flower Creeks, to name but a few, have deposited large rubble and gravel bars at their mouths. Historically, the Kootenai River obediently transported this material downstream. The Kootenai no longer has that ability due to reduced flows. These rubble and gravel bars have created an "aggrading" situation whereby the elevation of the tributary streambeds are actually rising which in turn causes channel changes, flooding and damage to adjacent property. Highway and railroad bridges across these tributary streams are also in jeopardy.

5) The Corps recently sent out an "Information Supplement" for the Libby Additional Units and Reregulating Dam. This document was dated January 1978 but was not received until June 1978. The supplement deals with construction of a temporary haul bridge. However, neither agency or public review was solicited by the Corps. Apparently, the Corps has chosen to ignore the review process.

These are the main issues I feel the state should actively pursue. The Corps, like any other government agency, must be responsive to the public they serve. We can no longer afford to sit back and watch our precious resources inundated and degraded with concrete mitigations.

If you have any questions or would like to further discuss the matter please feel free to contact me anytime. Wishing you well, I am

Sincerely,

Joe

Joe Murphy
Open Cut Bureau
Reclamation Division

cc: Jim Posewitz
Art Whitney

[illegible]

[illegible]

[illegible]

Helena, Montana
July 17, 1978

RECEIVED
JUL 19 1978
MONT. DEPT. OF NATURAL
RESOURCES & CONSERVATION

Scott Brown
Department of Natural Resources
32 South Ewing
Helena, Montana

Dear Scott:

Confirming our discussion of minimum flows in the Kootenai below Libby Project, we now recommend a minimum flow of 4,000 cfs. We have considerably better knowledge of fish populations and habitat in the Kootenai River now than we had when the project was first started. Our data indicate that above 4,000 cfs the predicted fluctuations in flow from the main dam or the rereg would have considerably less effect on aquatic habitat than they would at flows below 4,000 cfs.

By copy of this letter, I am asking the Kalispell region to elaborate on this recommendation and also to state the hours and days they recommend no change in water levels for the benefit of anglers.

Sincerely,

ARTHUR N. WHITNEY
FISHERIES DIVISION ADMINISTRATOR

ANW/sb
c.c. Jim Posewitz
Tom Hay

[illegible]

[illegible]

[illegible]	[illegible]
October 25, 1974	Exceeds 2 ft. hr.
November [illegible], 1974	Exceeds 2 ft. hr.
December, 1974	None
January, 1975	None
February 10, 1975	Exceeds 2 ft./hr. (twice)
March, 1975	None
April, 1975	None
May, 1975	None
June 13 - Aug. 12, 1975	Recorder Inoperative
[illegible], 1975	None
August [illegible], 1975	Exceeds 2 ft. hr.
August [illegible], 1975	Exceeds 2 ft. hr.
Sept. 5, 1975	Exceeds 2 ft./hr. (twice)
Sept. [illegible], 1975	Exceeds 2 ft. day
Sept. [illegible], 1975	Exceeds 2 ft. [illegible]
Sept. [illegible], 1975	Exceeds 2 ft./day and 2 ft./hr.
October [illegible], 1975	Exceeds 2 ft. hr.
October [illegible], 1975	Exceeds 2 ft./hr.
[illegible]	[illegible]

[illegible] (continued)

[illegible]	[illegible] ft. Str.
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible] 1 ft. Str.
June 1, 197[illegible]	Treated 1 ft. Str.
June 3	Treated 1 ft. Str. (twice)
[illegible]	Treated 1 ft. Str. (twice)
June 7-11, 197[illegible]	[illegible] vegetation [illegible] (cut or removed)
June 14, 197[illegible]	Treated 1 ft. Str. (twice)
June 15, 197[illegible]	Treated 1 ft. Str. (twice)
June 16, 197[illegible]	" "
June 17, 197[illegible]	" "
June 18, 197[illegible]	" "
June 21, 197[illegible]	" "
June 22, 197[illegible]	" "
June 23, 197[illegible]	" "
June 24, 197[illegible]	" "
[illegible]	" "
[illegible]	" "
[illegible]	"
[illegible]	[illegible] ft. Str.
[illegible]	[illegible] 1 ft. Str.
[illegible]	[illegible]
[illegible]	[illegible] ft. Str.
[illegible]	

VOL

4

JOV

♃

v.4

GEOLOGY

The reregulation dam is located on a geologic area known as the Wallace Formation. Gibson[1] described the formation in the Libby quadrangle as the most heterogenous formation of the Belt Series. The main constituents are calcareous or dolomitic limestone. The upper third of the formation is sandy sericitic and ferruginous shale a few hundred to a thousand feet thick.[2] The Wallace strata in this west central portion of Lincoln County are dark- to light-gray, green yellowish-green and blue-gray carbonate bearing laminated, thin-and medium bedded argillite siltstone, and subordinate gray and white quartzite, more sandy and calcareous argillite and siltstone. Upper Wallace Strata are non-calcareous laminated to medium-bedded argillite, siltstone, and quartzite imbedded with gray and white carbonate rocks containing stromalolite zones 1 to 10 feet thick[3] (also refer to the attached geology discussion from the COE EIS supplement I - Additional units and Reregulating Dam).

This bedrock formation dates back to pre-cambrian period. Since then the rocks have been deformed by compressional forces and igneous intrusions. The greatest activity occurred during Mesonic time. A subsequent period of tensional block faulting during Tertiary time resulted in downdropped structures such as the Rocky Mountains and Libby trenches. Recent fluvial and Pleistocene glacial deposits, over 500 feet thick in the Libby Trench, indicate that formation of the trench took place from Tertiary to at least glacial time.[4] During the Pleistocene Ice Age, ice thickness at the U.S. - Canada border was up to 4,000 feet. Glacial sediments form the bulk of the soil overburden. The Corps now believes that these glacial deposits are rather constant and undisturbed, indicating that there has been little tectonic activity since the end of the ice age 10,000 years ago.[5] The Corps studies indicate that these deposits have not been displaced by seismic activity. Therefore, their conclusion is that the major faults in the area are inactive.

---

[1] Gibson, Russell. 1948, Geology and Ore Deposits of the Libby Quadrangle, Montana. U.S. Geological Survey Bull. 956, 131 p.
[2] Johns, Willis M. 1970, Geology and Mineral Deposits of Lincoln and Flathead Counties, Montana. Montana Bureau of Mines and Geology Bull. 79, p. 25.
[3] Ibid p. 25

[4] U. S. Corps of Engineers, 1974. General Design Memorandum Phase I - Plan Formulation. U.S. Army Engineer District, Seattle, pp. 7 and 8.
[5] Telephone conversation with Mr. Ward and Mr. Callister (Corps geologists) on July 11.

One of the major faults mapped in Western Lincoln County is the [illegible] mile, high angle Thompson Lakes Fault. The west (downthrown) block shows drag saddles and valleys mark the position of the fault. The fault runs under the west side of the reregulating damsite according to John's reconnaisance level study.[6] The Corps' damsite trenching has determined that the Thompson Lakes fault occurs 1,500 feet east of the river's east bank with 2 branches of the fault passing under the damsite.[7]

This portion of Lincoln County has been categorized as a "moderate damage earthquake potential zone."[8] This is a zone in which much of the far western U.S. is also categorized. Dr. R.L. Konizeski reports that the area around the south end of Flathead Lake is a "zone of intensive seismic activity."[9] He also stated that 2 recent quakes had epicenters 20-30 miles southeast of Libby Dam. Dr. Konizeski was attempting to force the COE to collect 1 year of microearthquake data before allowing the Lake Kocanusa to be filled. His contention was that there is a correlation between the filling of some major reservoirs and the increased possibility of earthquake activity. A study done on the seimologic effects of Lake Mead show no noticeable correlation between change of seismic activity and the filling of Lake Mead.[10] It is Dr. Hayes assertion, that suggestions that this correlation may exist is clouded with uncertainty."[11] Seismologists are not willing to conclude that filling reservoirs will increase earthquake activity. However, there seems to be a concensus among professionals that collecting seismologic data before, during and after a reservoir project should be standard procedure to determine the level of micro-earthquake activity at the construction site. This information assists in evaluating the stab-

---

[6] [illegible] M. 1970. Geology and Mineral Deposits of Lincoln and Flathead Counties, [illegible] Bureau of Mines and Geology Bull. 79. pp. 64,65.

[7] [illegible] Engineers, 1975. General Design Memorandum Phase II - Project Design. [illegible] Engineers District, Seattle. Plate 8.

[8] [illegible], 1969. Seismic Risk Studies in the United States. Environmental [illegible] Administration, Coast and Geologic Survey. Figure 6.

[9] [illegible] 6, 1972. Letter to Senator Lee Metcalf. p. 1.

[10] [illegible] 1970. Seismic Study of Earthquakes in the Lake Mead, [illegible] of the Seismological Society of America. Volume 60.

[11] [illegible] U.S.G.S., Denver, Colorado.

ility of the project site.

Since Dr. Konizeski's letter in 1972, the Corps have installed three stations to record microseismic occurrances (microseismic means events register less than 3.5 on the richter scale). The data shows an area of activity 12-14 miles NE of the reregulating dam site. The largest earthquake recorded in a seismologically important radius of the dam site was 5.4. This was 20-30 miles SE of Libby Dam. For these reasons the dam has been designed to withstand a probable maximum earthquake of 5.5 Richter magnitude occurring 12-14 miles away. These are somewhat different magnitudes than were concluded by Dr. David B. Slemmons in his report to the Corps.[12] However, since that time new data has convinced both the Corps and Dr. Slemmons that the faults running through or near the dam site are inactive and thus dam design should be based on the largest regional historic earthquake.

CONCLUSIONS

1. The reregulation dam site is located in an area of faulting and folding.
2. Trenching has indicated that the faults are inactive.
3. There exists an area of seismic activity 12-14 miles NE of the dam site.
4. The largest regional historic earthquake was 5.4 Richter magnitudes.
5. The dam is being designed to withstand a probable maximum occurrance of 5.5 Richter magnitudes having an epi-center 12-14 miles from the dam site.

The geology design criteria was arrived at after extensive study by the Corps. It appears that it will both accurately and adequately dictate construction procedure that will insure the safety of the structure during a maximum probable earthquake.

---

[12] U.S. Corps of Engineers, 1973. General Design Memorandum Phase II - Project Design. Volume 2, U.S. Army Engineer District, Seattle. p. C-9

18. Under natural conditions, there are two distinct flow periods in the Kootenai River during the year, the snowmelt runoff or flood season of April-August and the low flow period through the remainder of the year. By the first of April, riverflow, normally about 5,000 c.f.s. at the time, is increased by the melting snowpack, attaining a peak which may vary from about 15,000 to over 100,000 c.f.s. about the first of June. Flow then decreases, leveling off between 5,000 and 10,000 c.f.s. by the end of August. About mid-November, with the onset of freezing weather, riverflow falls to between 2,000 and 5,000 c.f.s., remaining in this range until late March. Freshets can occur at any time during the low flow period as a result of heavy rainfall or unseasonable snowmelt.

19. As a result of the construction of Libby Dam, riverflow downstream no longer follows the natural pattern, but is lower in summer and higher in winter than previously. Releases from the lake normally are in the 5,000 to 9,000 c.f.s. range from April through mid-July, permitting Lake Koocanusa to approach its maximum elevation of 2459 feet. When the lake is nearly full, outflow is gradually increased to equal inflow, normally about 20,000 c.f.s. Natural inflow usually passed through the dam until about the end of October when flow has receded to about 8,000 c.f.s. in most years. During the winter months, discharges are increased to a range of 10,000 to 20,000 c.f.s. approximately while the lake is being lowered to provide storage for the next spring's snowmelt. Abnormal conditions would require variations of this pattern. A very large forecast snowpack, for example, could result in releases of 20,000 to 40,000 c.f.s. during the winter, as necessary to provide storage, and discharges of 20,000 to 50,000 c.f.s. during the spring-summer flood season. A flow of 50,000 c.f.s., which is well below flood damage level, would be exceeded once in 100 years on a statistical average.

GEOLOGY

20. General. The study area lies in northwest Montana, within the Northern Rocky Mountain physiographic province. Northwest Montana is characterized by high, rugged, northwest-trending mountain ranges, separated by narrow, linear valleys, controlled by a bedrock structure and modified by glacial erosion and sedimentation. The underlying bedrock is mostly fine-grained metasedimentary quartzite, argillite, and impure limestone, part of the Precambrian Belt Series, deposited as sand, silt, and clay in a broad, shallow basin. These rocks were subjected to deformation by compressional forces and intrusion by basic igneous dikes and stocks. The greatest activity occurred during Mesozoic time. A subsequent period of tensional block faulting during Tertiary time resulted in downdropped structures such as Rocky Mountain and the Libby Trenches, the latter shown on plate 12. Recent fluvial and Pleistocene glacial deposits, over 200 feet thick in the Libby Trench,

indicate that formation of the trench took place from Tertiary to at least glacial time. Relatively fresh fault scarps and strong lineations appearing on radar imagery also suggest continuing tectonic activity. The study area is in a part of northwest Montana covered by Pleistocene ice advancing south from British Columbia. Ultimate ice thickness was about 4,000 feet at the international boundary and about 2,000 feet at Kalispell. Glacial sediments of till and subsequent fluvial and lacustrine deposits form the bulk of the soil overburden.

21. Local Geology. The geologic structure in the study area is dominated by the sharp, faulted, and broken Kootenai Anticline and an associated series of compressional faults, shown on plate 12. These structures are believed to strike NNW along the Kootenai valley between river miles 206.5 and 210.5. Bedding planes dip at angles of 55 to 70 degrees. The Ripley fault has been interpreted from limited drilling data. The Thompson Lakes Fault (mapped by others from 50 miles north to 30 miles south of the study area) is inferred at this location from radar imagery. The tensional E-W Bakker Ranch Fault, in the valley from river mile 204 to 206.5, transverse to the anticline axis, is inferred from an offset of the Libby Trench and lack of structural continuity across the valley in this vicinity. The Swede Mountain Fault between the Libby Trench and the study area is inferred from an adjacent sharp, linear mountain front and radar imagery. The bedrock contains no significant fossil forms and there are no mines or prospects in the reregulation dam and reservoir study area.

22. Seismicity. Since 1964, the U.S. Geological Survey has noted three minor earthquakes near the study area, two with epicenters 20 miles southwest and one 25 miles northwest. Although no major earthquakes have been recorded in the immediate vicinity of the study area in historic time, physiographic evidence suggests that tensional movement has occurred in the Swede Mountain - Bakker Ranch - Ripley - Thompson Lakes fault system during postglacial time and this has been a consideration in design of structures.

23. Valley Overburden. This reach of the Kootenai valley is bounded by moderate to steep rock walls which break abruptly onto a flat valley floor. The present river channel lies 8 to 20 feet below its flood plain and occupies about one-third of the valley bottom. Valley floor deposits are river silts, sands, and gravels, typically less than 30 feet thick, but with a maximum known thickness of 84 feet. Larger tributaries, such as Rainy Creek, have built coarse detrital fans onto the valley floor. Several terraces of glacial deposits rise above one side or the other of the valley floor, such as Big Bend, Jennings, Kennedy Gulch, and Zonolite.

VOL

5

PRELIMINARY
PROPOSED POSITION AND ISSUE PAPER
LIBBY DAM ADDITIONAL HYDROPOWER UNITS

The Army Corps of Engineers has begun work on the installation of four more generators in the powerhouse at Libby Dam. A reregulating dam will be built to reduce downstream fluctuations on the Kootenai River that would otherwise result from the proposed conversion to peaking operation at Libby Dam. By increasing the number of generators from four to eight, the installed capacity in Libby Powerhouse will be increased from 449 megawatts (MW) to 966 MW. The energy produced depends on the volume of water passing through the generators and the elevation difference or head between the lake level behind the dam and the water level below the dam. Since the powerhouse was opened in 1975, all outflows from Libby Dam have been used to generate power, i.e. no water has been discharged through the spillway. Because the addition of four more generators changes neither inflows to the reservoir nor the head eight generators will not produce more energy than the four currently in place. Although the additional generators will not produce more energy, they will produce energy at a time when it is more valuable by concentrating generation during those hours of peak electrical use. The purpose of the reregulating dam is to smooth out the fluctuations produced by rapid changes in outflows from the powerhouse.

The Libby project has almost 70 years of history. In 1909 with the formation of the IJC, Canada and the United States have been planning and developing the Columbia River System. In 1950, the Flood Control Act approved the Libby project for flood control, power generation, and other water uses. Based on this Act (P.L. 516) the United States applied to Canada for approval to build Libby Dam under the Boundary Waters Treaty of 1909. However, the United States withdrew that application and it wasn't until June 1964, when with the approval of the Columbia River Treaty ratification by both countries, that the Libby Dam Project received international consent. Up to 1974, whatever association the reregulating dam had with Libby Dam Project is contained in P.L. 516 of 1950. Construction of Libby proceeded from 1966 to 1973.

Design Memorandum 50, describing the basic information about the reregulating dam was published in January 1970. In July, 1973, a District Engineer's report recommending power generation in the reregulating dam was submitted to the Senate Public Works Committee (S.D. 93-29). Subsequent authorization of Phase I Studies for advanced engineering and design for the generating facilities was granted as part of the Water Resources Development Act of 1974 (P.L. 93-29). It is expected that Congress will consider authorization for construction of power in the reregulation dam in 1978.

In recent months the potential addition of generators at Libby Dam has stirred considerable controversy. Various organizations and individuals have begun to question the need for the additional peaking power, the wisdom of inundating 10 more miles of the Kootenai River, the use of a reregulating facility to smooth river flows only to existing maximum limits, and the impact of the project on the bald eagle. Senator Paul Hatfield's letter to the Corps and Governor Judge have highlighted some problems with the project. He asked Governor Judge what fluctuation criteria the State of Montana would like to have adopted if operation criteria for the reregulating facility were open to negotiation. That request, the public controversy, and an objection filed with the Department concerning applicability of the Major Facility Siting Act to the project indicates that this state should formulate a policy on the addition of generators at Libby Dam;

A number of questions have been raised regarding additional generators at Libby Dam and the associated reregulating. These issues must be understood before a reasonable policy on the project can be established. A summary of each issue is presented below.

Economics

Although the project is scheduled to be operational by 1982-83 surplus peaking capacity is projected to be available through 1989-1990 Project benefits up to 1990 would only be the value of additional system reliability and possible

unidentified cost savings from other peaking power plants. These benefits are probably insignificant. The Corps defended a need for future peaking power by pointing to a present (1974) shortage. This defense of the project makes no sense because only future shortages can justify projects to supply power in the future and current shortages don't establish the likelihood of future shortages.

The benefit-analysis completed by the Corps was inadequate and failed to establish that additional generation is the least cost method for increasing the peaking capacity of the PNW Power Pool.

1. A nuclear plant is an unlikely alternative to the existing operations.
2. Recreational values foregone due to the reregulating reservoir were not considered.
3. The omission of archeological costs in the B/C analysis is indefensible.

The Corps' response to Senator Hatfield is inadequate, and contradicts the economic analysis done on benefits of the additional generators and reregulation.

Because no likely benefits are identified for the additional capacity during the seven years following project completion, it is highly probably that the benefits of a seven year project delay exceed the costs of a delay. The Corps has never done an adequate benefit cost analysis on this project. A delay is economically beneficial and gives them time to correctly analyze the real benefits and costs of their proposal. Project costs are greater than $200,000,000. A project of this magnitude merits an adequate evaluation and the project should be delayed until this evaluation is completed.

Endangered Species

The Endangered Species Act of 1973 offered protection to the bald eagle which may be adversely affected by the Libby project. A study to determine the effects of the project on the bald eagle is underway, but will not be completed until next summer. However, the Army Corps of Engineers has, with concurrence to the U.S. Fish and Wildlife Service, begun construction activities directly related

to the project. The Corps decision to begin construction is an indication that a piecemeal approach may be imminent; an approach that is contrary to the intent of the Endangered Species Act and that portion of the Code of Federal Regulations which establishes procedures for good faith interagency consultation before an irreversible or irretrievable commitment of resources is made. All construction of the project should stop, at least until results of the eagle study show that project will have no adverse effect on the eagles or that these effects can be properly mitigated.

Downstream Fluctuation Criteria

The addition of four generators at Libby Dam and the operation of all eight units for peaking power requires that a reregulating facility be built downstream to smooth out releases that will vary from 2,000 cfs to 40,000 cfs in an eight-hour period. The Corps has adopted the following discharge limits and maximum fluctuation criteria for Libby Dam releases now and for the reregulating dam when it is installed.

- A minimum instantaneous discharge of 2,000 cfs
- Maximum fluctuations of one foot per hour, four feet per day, May through September; two feet per hour, six feet per day, October through April

The Montana Fish and Game Department feels that more restrictive limits should be adopted. It is apparent that a reregulating facility should be used to smooth fluctuations, not necessarily just to limit previously established, and should not be used primarily as a hydropower facility as may be the case with the Libby reregulating dam. The Army Crops of Engineers should, in cooperation with the U.S. Fish and Wildlife Service and Montana Fish and Game Department reevaluate fluctuation criteria to ensure that downstream fish and recreation uses are properly protected.

In addition, Senate Joint Resolution Number 20 states "that the maximum allowable fluctuation should be limited to less than three feet per day."

Geology

The Thompson Lakes fault runs under the west side of the reregulating damsite according to a Montana Bureau of Mines and Geology study. The Corps' studies have determiend that the fault is 1500 feet east of the Kootenai River with 2 branches passing under the damsite. The reregulating facility has been designed to withstand a probable maximum earthquake of 5.5 Richter magnitude occurring 12-14 miles away. It appears that the Corps design and construction procedures can insure the safety of the strucutre during a maximum probable earthquake.

Authorization

The Corps of Engineers claim authorization due to a single sentence in the P.L. 516 of 1950. This document refers to a reregulating facility only in that one may be needed at some future time. The authorization is questionable, however, at this point, there is little to be gained in contesting it. Senator Paul Hatfield feels there is not sufficient strength in Congress to deauthorize the project. The important point is that this clandestine type of authorization should not be allowed in the future. Corps projects should be well identified and evaluated and receive state support prior to authorization by Congress.

Reserved Power

The record of Montana's geographical power preference for the sale and distribution of energy produced by Federal hydroelectric projects within the State of Montana is well established through public law and Congressional intent, and the power allocation determinations which have been made in the past by BPA concur in, and support, that record. The policy of geographical power preference should be continued by applying this preference to power generated by the four additional power units in Libby Dam and all the power that may be generated by the proposed

Libby Reregulating Dam.

Mitigation

Congress has authorized $4 million for the mitigation of fishing losses and $2 million for the mitigation of wildlife losses due to the Libby project. That level of mitigation is grossly inadequate and, in addition, should apply only to main Libby Dam and not the proposed reregulating facility. A habitat unit evaluation of the entire project (main dam and reregulating dam) needs to be made and appropriate levels of funding requested to adequately mitigate losses to the State of Montana.

DRAFT

MONTANA OPTIONS

The State of Montana could take a number of positions regarding additional peaking power at Libby and the associated reregulating facility. However, discarding unreasonable or impractical alternatives leaves the options presented below. A basic assumption made in each of these options is that, as presently formulated, the Libby reregulating project does not represent the best interests of Montanans.

Option No. 1 - Acknowledge but Alter

This option calls for Montana to acknowledge the project will probably be built but recognizes its shortcomings and demands alteration of some project features. It ignores the fact that the Corps has failed to adequately justify the project but demands the Corps properly mitigate and compensate the state for adverse effects on state resources.

This option could require that, under the President's new cost-sharing policy, Montana provide 10 percent of the costs of placing power in the reregulating facility. In that case the state would also share in revenues produced by power in the reregulation dam. It is also possible that the Corps could get Congress to waive the state cost-share requirement.

A re-evaluation of fluctuation criteria is essential to ensure that, in the long term, fish habitat and recreation are not excessively degraded.

Construction activities should cease, at a point that will allow an orderly halt, until the bald eagle studies are completed and evaluated. The spirit, as well as the letter, of the Endangered Species Act must be honored. The bald eagle is clearly the type of species Congress had in mind (while the snail darter probably wasn't) when it overwhelmingly passed the Act.

Mitigation of fish, wildlife, and recreation losses due to the entire Libby Project has never been satisfactorily resolved. A habitat unit type of evaluation should be prepared for Libby Main and reregulating dams for two reasons: (1) to point out the mitigation travesty on the main dam, and (2) to identify mitigation

needs for the reregulating dam.

Because the state may be required to cost-share installation of power in the reregulation dam we should be convinced that portion of the project is economically sound. The suggested policy is to require the state to provide 10 percent of total project costs where projects supply vendible products, up to a maximum of ¼ of 1 percent of the state's revenues. The latter establishes Montana's costs in this situation at approximately 500,000. ~~dollars.~~

Option No. 2 - Stop Project

Several environmental organizations are now seeking an injunction to stop construction of the Libby reregulating facility citing problems with project authorization, economic analysis, and endangered species. Montana, under this option, would join the litigation with those organizations. The intent would be to halt the project. If further detailed analysis revealed that the project produced more benefits than disbenefits the state would support its construction. On the other hand, if the project was determined not to be feasible (economically or environmentally) then it would not be built.

Authorization or deauthorization of federal projects is determined by Congress, not by state desires. Although the Corps claim to be sensitive to state wishes, and in some cases are, they know which side the bread is buttered on. The same groups that are seeking an injunction to stop the project have petitioned the Department of Natural Resources and Conservaation, claiming that the project is under the authority of the Major Facility Siting Act. In the past, the department has felt this is not the case; however, it is now researching that possibility. If, legally, the department determines that federal projects are covered by the Act then the Corps will oppose that claim in court. If it is determined in court that the Act does apply then Montana will have a mechanism to evaluate and pass judgement on the project. The Department's reply to the petition will not be available for at least another month.

Option No. 3 -- Status Quo

Montana state agencies are members of an environmental coordinating committee established by the Corps for the Libby project. The purpose of the committee is purportedly to monitor construction activities so that natural resources ~~are~~ will be properly protected. State representatives on that committee are convinced that no major change in construction activities could result from the committee. Even so, this option would attempt to use the committee to reevaluate issues such as fluctuation criteria and mitigation.

Recommended Option -- No. 1 Acknowledge but Alter

Option No. 1 recognizes that the project will probably be completed and require agressive state action to ensure that Montana's interests are protected as much as possible. While the option is probably the most reasonable it could well be ineffective. When a project is this far along the Corps tends to resist modifications that could change economic feasibility -- even though ~~that~~ original feasibility calculations are highly suspect.

PAUL HATFIELD
MONTANA

COMMITTEES:
JUDICIARY
ARMED SERVICES

United States Senate

WASHINGTON, D.C. 20510

July 1-, 1978

Corps letter only
to Dorey

Honorable Thomas Judge
Governor
State Capitol
Helena, Montana 59601

Dear Governor Judge:

Because of the interest which you have expressed in the Libby Reregulating Dam controversy, I am enclosing the Corps of Engineers reply to my earlier letter on the subject. The reply reproduces the questions which I asked.

You will note from my letter to the Corps that I state in imprecise terms that many residents of the Libby area feel they were "misled" by Corps statements and actions. Those who feel deeply about this issue should search both their records and their memories for such examples. I am a newcomer to this issue, and I can only advance general feelings about the project unless the the public can come forward with specific grievances.

I am now reviewing the Corps reply with an eye to a possible second round of questioning.

Many Montanans have written that my attempts to modify the fluctuations in the lower Kootenai do not go far enough. They want the entire reregulation dam stopped. I am convinced that the Congress will not halt construction. Therefore, I feel that the greatest contribution I can make in my remaining months in the Senate is to try to assure a fair and equitable operation of the Libby complex.

I hope this information will be of interest to you.

Very truly yours,

Paul Hatfield

Paul Hatfield, U.S.S.

Fascinating
has question
&
answer
rundown
from Corps

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

14 JUL 1978

Honorable Clifford Alexander
Secretary of the Army
Washington, D.C. 20310

Dear Mr. Secretary:

Acting Assistant Secretary Charles R. Ford's letter of October 5, 1977, submitted the report of the Chief of Engineers on Libby Reregulating Dam Power Units, Kootenai River, Montana, in accordance with Section 4 of Executive Order No. 9384, and requested information as to the relationship of the report to the program of the President.

We have reviewed the report of the Chief of Engineers in light of the President's water policy message to the Congress of June 6.

We conclude that Libby Reregulating Dam Power Units if modified meets the project selection criteria specified by the President. However, the following modifications are required to meet provisions of the water policy.

-- In order to insure that this project is in conformity with Executive Order 11988 on Flood Plain Management, the Department of the Army should provide a certification of compliance with Executive Order 11988 prior to any request for construction appropriations.

-- The Department of the Army should modify the project in presenting it to the Congress to conform to the cost-sharing policies adopted by the President.

There is no objection to the transmission of the report to the Congress with the above identified amendments or to the authorization of the amended project from the standpoint of the President's water policy. No commitment, however, can be made at this time as to when appropriations would be requested for the project, if authorized by the Congress, since this would be subject to review in the President's annual budget process.

Sincerely,

Eliot R. Cutler
Associate Director for
Natural Resources,
Energy and Science

SJR [illegible]

A JOINT RESOLUTION OF THE SENATE AND THE HOUSE OF REPRESENTATIVES OF THE STATE OF MONTANA URGING THAT THE REREGULATING DAM ON THE KOOTENAI RIVER BE DESIGNED AND BUILT TO REGULATE RIVER FLOWS.

WHEREAS, the reregulating dam below Libby Dam was designed primarily to regulate down-stream flows to enhance the fishery and recreational use of the Kootenai River; and

WHEREAS, the U.S. Army Corps of Engineers has designed power generation into the reregulating dam at the expense of increased river fluctuations or, at best, the present criteria; and

WHEREAS, the river fluctuations of criteria of six feet per day in the winter and four feet per day in the summer were set arbitrarily and without adequate public input; and

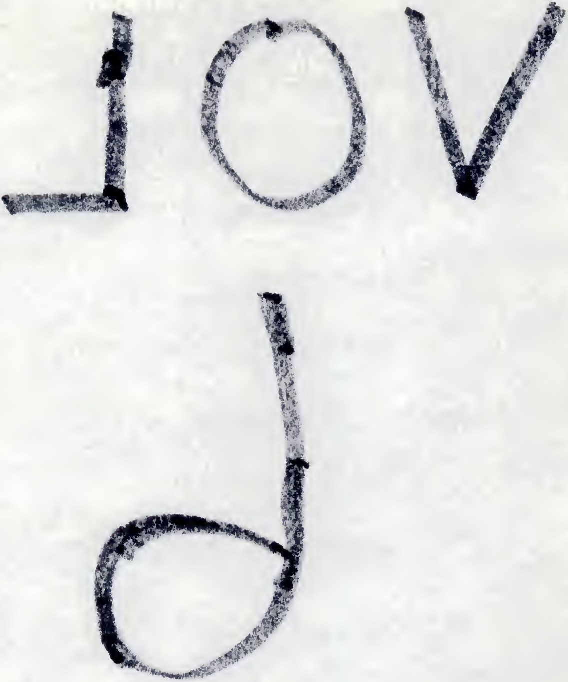
WHEREAS, these fluctuations are sufficiently high to greatly reduce fishing and recreational opportunities in the river.

NOW, THEREFORE, BE IT RESOLVED BY THE SENATE AND THE HOUSE OF REPRESENTATIVES OF THE STATE OF MONTANA:

That the reregulating dam be designed and built to regulate river flows for enhancement of the fishery and the recreational use and that the maximum allowable fluctuation be limited to less than three feet per day.

VOL

6



MEMORANDUM July 17, 197[illegible]

TO: Gary Fritz

FROM: Chris Toccalli

RE: Background issue paper, Libby Reregulating Dam

The Libby project has almost 70 years of history. In 1909 with the formation of the IJC, Canada and the United States have been planning and developing the Columbia River System.[1] In 1950, the Flood Control Act approved the Libby project for flood control, power generation and other water uses. Based on this Act (P.L. 516) the United States applied to Canada for approval to build Libby Dam under the Boundary Waters Treaty of 1909. However, the United States withdrew that application and it wasn't until June 1964, when with approval of the Columbia River Treaty ratification by both countries, that the Libby Dam Project received international consent. Up to 1974, whatever association the reregulating dam had with Libby Dam Project is contained in P.L. 516 of 1950. Construction of Libby proceded from 1966 to 1973. Design Memorandum 50, describing the basic information about the reregulating dam was published in January 1970. In July, 1973, a District Engineer's report recommending power generation in the reregulating dam was submitted to the Senate Public Works Committee (S. D. 93-29). Subsequent authorization of Phase I for advanced engineering and disign for the generating facilities was granted as part of the Water Resources Development Act of 1974 (P. L. 93-29). ~~Subsequent authorization of Phase I for advanced engineering and design for the generating facilities was granted as part of the Water Resources Development Act of 1974 (P. L. 93-251).~~[2]

In the Libby Project EIS supplement I, the COE once again reiterated that the reregulating dam was part of the Libby Project. The exact language used is "...... authorized by the Flood Control Act of 1950, which adopted the plant for Libby,

---

[1] Boundary Water Treaty, 1909. Article VII.

[2] Corps of Engineers, 1974. General Design Memorandum Phase I - Plan Formulation, U. S. Army District, Seattle, pp. 1 and 2.

including reregulation, described by HD 531, Eighty-first Congress, Second Session.[3] There is no 'Plan' in H.D. 531 describing any type of reregulation program, project or facility. The following statement is the only statement regarding a reregulation project: "If it becomes necessary to reduce this fluctuation, reregulation will be considered when the need arises.[4] H.D. 531 contains neither preliminary drawings of a Libby reregulating facility nor budgetary allocation for design or construction of such a facility. Regardless, the COE has interpreted this one line quotation as sufficient congressional authorization to design and construct a reregulating facility.[5] However, without at least a general discussion of the purpose, proportion, and costs of a reregulation program, it seems unlikely that Congress could have intended to authorize a reregulation project. Currently, it appears the state has little to gain by challenging the question of authorization. However, it should be communicated in the strongest possible terms that future projects constructed in Montana must have adequate authorization accompanied by a clear description of the program or project being authorized.

---

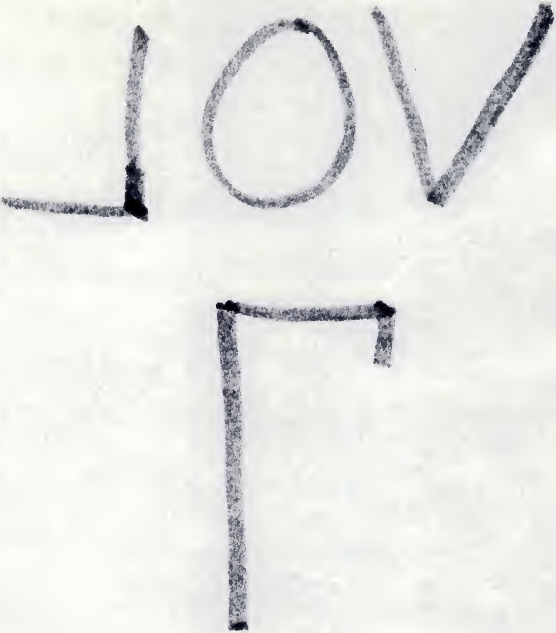
[3] COE, 1974. Final Environmental Impact Statement Supplement - Libby Additional Units and Reregulating Dam. U.S. Army Engineer District, Seattle, Washington. p. 1-1

[4] 81st Congress, 2nd Session. Columbia River and Tributaries, Northwestern U.S. H.D. 531 - Volume II, p. 464.

[5] Corps of Engineers, 1974. General Design Memorandum Phase I - Plan Formulation. U.S. Army Engineer District, Seattle, p. 1.

VOL

7



MITIGATION FOR FISH AND WILDLIFE LOSSES

The Kootenai River flowed uninterrupted through roughly 100 miles of northwestern Montana before Libby Dam was constructed. Lake Koocanusa has since eliminated one-half of that formerly free-flowing, 100 mile stretch and it extends into British Columbia an additional 42 miles. That portion of the reservoir within Montana alone has a water surface area of 28,850 acres, assuming the reservoir is at its normal full pool elevation of 2459 feet (U.S. Army Corp of Engineers, 1974).

The proposed reregulating dam would inundate an additional 10 miles of the Kootenai River, or 20% of that portion of the stream remaining in Montana.

It will be pointed out early in this discussion that opposing views are held with regard to the mitigation of fish and wildlife losses associated with the Libby Dam project and the proposed reregulating facility.

The Corps of Engineers presently maintains the position that all fish and wildlife losses resulting from the project should be treated as a single issue. That is, the existing dam and the proposed dam are to be considered as a single project in terms of fish and wildlife mitigation measures (U.S. Army Corps of Engineers, 1974).

The Montana Department of Fish and Game, on the other hand, with the concurrence of the U.S. Fish and Wildlife Service, maintains the position that fish and wildlife losses associated with the existing dam and any future losses resulting from the construction of a reregulating facility are separate issues. According to this position, after measures have been taken to mitigate losses already realized (i.e. losses realized as a result of Libby Dam), additional compensation for losses that would result from construction of the reregulating facility will be necessary (Whitney, personal communication).

All of the other state departments involved in the reregulating dam issues do not concur with the Department of Fish and Game and the Fish and

Wildlife Service on this matter. Support for that position will be presented in the remaining discussion.

Another long-standing controversy on the issue of fish and wildlife mitigation measures is centered around the precise definition of "mitigation measures". Whether the funding of required investigations and evaluations is to be considered mitigation is questionable to fish and wildlife interests and the problem remains unsettled.

It is the view of the Department of Fish and Game and the Fish and Wildlife Service that funding of investigations and the like are part of the overall costs of advance planning for projects and their subsequent operations. Capital investments in improvements and related costs of operating, maintaining and repairing such improvements are, according to this position, the only measures that are to be considered as mitigation (Brown, personal communication).

Fisheries

Prior to impoundment, the Kootenai River was an excellent fishery along its entire length in Montana. It is considered to have been capable of sustaining harvests far in excess of present or anticipated demands. The mainstem and nearly all of its tributaries of significant size were self-sufficient in terms of reproduction. And, although the Kootenai River received rather light fishing pressure, due largely to the area's low human population, it was classified as a class two stream. Class two streams are those considered to possess qualities of statewide significance or value (Montana Department of Fish and Game, 1971).

The most abundant game fish found in the Kootenai River in Montana is the mountain whitefish. The westslope cutthroat trout, rainbow trout and dolly varden are common game fishes in the system.

Since Libby Dam's construction, downstream fishing has improved markedly. Warmer water temperatures, the elimination--or at least a reduction--of natural and man-induced pollution from upstream, and the dam itself, acting as a barrier

to the natural upstream movements of fishes, are a few factors to which improved fishing may be attributed. How long the condition will last is unknown.

Overall, however, Libby Dam has adversely affected the Kootenai River fishery and there is little doubt that the condition will deteriorate further, given time. Past experiences with reservoirs overwhelmingly support this feeling of pessimism. A fluctuating reservoir with annual drawdowns ranging up to 175 feet and the flooding of 90 miles of the main stem and roughly 14 miles of important tributary streams present conditions that favor rough fish.

In order to provide adequate fishing for a game fish in Lake Koocanusa, it is estimated that an annual stocking of 50,000 pounds of 4-inch cutthroat trout will be necessary. This level of stocking should be sufficient mitigation for fisherman-day losses resulting from inundation of the stream, according to the Department of Fish and Game (1974).

The westslope cutthroat trout, which was only recently removed from the federal endangered species list, is judged to be the best choice among game fishes for being managed in Lake Koocanusa (Montana Department of Fish and Game,1974).

Public Law 93-251, the Omnibus Bill of 1974, is a rivers and harbors preservation act that authorized numerous federal water projects. Specific Congressional authorization was given by PL93-251, Section 48, for the mitigation of fishery losses associated with the Libby Dam project not to exceed $4 million. The major portion of that money will be used to construct and operate a fish hatchery at Murray Springs. On May 15, 1978, the JIJ Construction Company of Bellingham, Washington was awarded a contract to begin construction of the hatchery. The bid price was $1,943,000 and construction has begun (Bonde, personal communication).

It is agreed that the Department of Fish and Game will operate the hatchery under contract with the Corps of Engineers, but opinions very among biologists as to how long the hatchery can be operated with approximately $2 million remaining. The general feeling is that $2 million should permit its operation

for 10-12 years (Whitney, personal communication). When asked "and then?" both Corps of Engineers and Department of Fish and Game representatives have expressed the hope that additional Federal assistance will be provided for the continued operation of the hatchery. The Corps supports additional funding for operating and maintaining the hatchery for the life of the Libby Dam project; however, it is the state's responsibility to seek the additional funding through its own Congressional Representatives.

Although PL93-251 authorized $4 million for the mitigation of fishery losses, and construction of Murray Springs Hatchery has begun, it is not clear whether the money was ever appropriated. If it has not been appropriated, then the Corps of Engineers has apparently begun construction of the hatchery with its own funds.

The establishment of numerous cutthroat trout spawning, or rearing streams represents another major mitigative measure. A $40,000 pilot study on Young Creek was recently completed. It was intended to determine the feasibility of establishing certain tributaries that drain into the reservoir as spawning runs for cutthroat trout. Upstream barriers were removed, some limited poisoning was done to eliminate undesirable fishes and young trout were planted in the upper reaches. Department of Fish and Game fishery biologists viewed the initial results as a success and have therefore carried out similar work on such tributaries as Sullivan, Big, Bristoe, Canyon, Five-mile, Cripple Horse and Tobacco creeks.

The Corps has funded much of the work associated with this stream improvement and rearing effort, including the hiring of a full-time project fishery biologist since 1969. In addition, two field biologists now assist the project fishery biologist. However, the Department of Fish and Game planted 2½ million fingerlings in the streams mentioned above, from 1972 to 1975, and [illegible] for

them out of their own funds. A bill was submitted to the Corps in 1976 for those plantings, amounting to [illegible], but no reply has yet been received from the Corps. Another one million fingerlings have since been planted in Lake Koocanusa and tributary streams by the Department of Fish and Game (Colley, personal communication).

Yet another major mitigative measure carried out by the Corps involved the placing of groins in altered stream channels to reduce erosion. The Department of Fish and Game had originally requested wing deflectors instead of groins; however, the request was denied. According to May (personal communication), the groins placed in the Fisher River, where approximately 10 miles of channelization resulted from railroad relocation, have served to reduce erosion adequately, but those altered sections have not developed into good game fish habitat. Suckers have been found to be more abundant in altered sections of the Fisher River than in unaltered sections (Montana Department of Fish and Game, 1974). Altogether, construction of Libby Dam resulted in approximately 50 channel changes in important tributary streams such as the Fisher River, Wolf Creek and Fortine Creek (May, personal communication).

The Fisher River, which would be "cut off" between the main dam and the reregulating dam, should the latter be built, has traditionally been one of the most important tributaries of the Kootenai River. A vital spawning run for cutthroat trout, dolly varden and whitefish will be lost. And with fluctuations of up to 30 feet during peaking operations at the main dam (U.S. Army Corps of Engineers, 1970), the proposed reregulating reservoir will scarcely support viable populations of aquatic organisms.

A somewhat comprehensive list of investigations and actual improvements that have been funded by the Corps in an attempt to compensate for fishery losses is attached.

Gas Supersaturation

The problem of gas supersaturation below Libby Dam is closely related to this [illegible].

Spilling over the dam began in [illegible], resulting in gas at greatly supersaturated levels in the river. The condition caused physiological distress and death, particularly in fishes, when approximately 110 percent saturation is exceeded (May and Huston, 1973). Gas supersaturation levels as high as 147 percent were monitored two to five miles below the dam, 124% below Kootenai Falls and 111% at the international border (Idaho-British Columbia) nearly 100 river miles downstream (U.S. Army Corps of Engineers, 1975).

Symptoms of this phenomenon in fishes, particularly nitrogen supersaturation, were observed as far downstream as Troy, Montana. In a popluation study of a 13,000 feet section of the Kootenai River below Libby Dam, before spilling occurred, 38,000 whitefish over six inches total length were estimated. One year after spilling had begun, a similar attempt revealed an insufficient number of whitefish was available to make a valid census estimate (May and Huston, 1973).

The problem was greatly reduced -- possibly largely eliminated -- once water began passing through the generators some three years after it had begun. The four generators in Libby Dam at the present can handle approximately 20-25,000 cfs. High spring runoff necessitating spilling will cause the problem once again, although the past three years have apparently not forced spills.

What effect additional generating units and the proposed reregulating facility would have on the problem is not clearly defined. While four more generators in the main dam would increase the capacity of the dam to pass water through the generators, the ability of the reregulating dam and its spillway(s) to prevent gas supersaturation is speculation. Plans to incorporate a spillway designed to reduce the likelihood of the problem were recently changed in favor of saving money on a more conventional spillway (U.S. Army Corps of Engineers, [illegible]).

If gas supersaturation below the reregulating dam can be prevented only by passing water through its generators as well, what is their capacity and how would such an operational demand affect downstream fluctuation and flow criteria?

Wildlife

Lake Koocanusa inundated approximately 24,000 acres of prime bottomland as wildlife habitat. Much of it was critical winter range for big game species such as deer, elk, moose and bighorn sheep; however, it was equally critical for numerous other game and non-game animals. The relocation of roads and railroads also produced adverse impacts on existing wildlife populations and their habitats.

In attempting to compensate for wildlife losses, the Corps has funded a number of studies, has provided for a project wildlife biologist and, most recently, has begun purchasing land to mitigate that which was inundated.

Public Law 93-251, which authorized $4 million for fisheries mitigation measures, also authorized the purchase of up to 12,000 acres of land at a cost not to exceed $2 million. Even if land had been purchased as early as 1974, it would have been difficult to purchase one-half of that amount of land with $2 million. Today, the Corps is negotiating the purchase of little more than 2000 acres and has thus far actually purchased a total of 1,375 acres north of Eureka at a cost of $611,000 (Kay, personal communication).

The Corps has investigated other properties throughout the area and has described seven priority categories. The 1357 acres already purchased were in the Corps' first priority category and more parcels in that category were being appraised and sought as of July 1.

Although the mineral rights to the land already purchased are outstanding, the Department of Fish and Game agreed on the purchase in view of no mining activity anticipated (Kay, personal communication).

Most of the arguments that have surfaced regarding fisheries mitigation measures, as mentioned in the previous section, apply also to wildlife mitigation measures. Most notably, the Corps maintains that once the $2 million has been spent on land acquisition, there are no other funds for which it is authorized to seek additional input or money. The Corps does, however, support the acquisition of up to 12,000 acres for wildlife habitat (U.S. Army Corps of Engineers, 1978).

Department of Fish and Game personnel feel that even if 12,000 acres were acquired, it would not adequately mitigate wildlife losses realized by the construction of Libby Dam. It must be recognized that wildlife already inhabitited those lands being purchased for mitigation. New wildlife habitat will not be created by such purchases, although the Corps has assisted the Department of Fish and Game and the U.S. Forest Service in determining ways to improve the carrying capacity of those lands for certain wildlife species.

A habitat unit evaluation was proposed by the Department of Fish and Game, whereby the value of the habitat lost would have determined the number of acres needed to replace it. Obviously, since some wildlife already inhabited replacement lands, considerably more than 12,000 acres would be required to actually mitigate the 24,000 acres inundated by Lake Koocanusa alone. But, such a proposal seems to be out of the question -- a limit of $2 million remains in effect and it is apparent that little more than 3000 acres can be purchased for that figure.

To presume that 3000 acres will properly mitigate the loss of 24,000 acres of prime wildlife habitat is clearly unreasonable. To presume that 3000 acres will properly mitigate all anticipated losses, including an additional 10 miles of bottomland habitat, should the reregulating facility be built, is absurd.

The total cost of the Libby Dam, as it stands, was approximately [illegible] million. The estimated cost of adding four generating units and reregulation facility is approximately $225 million more. The $2 million authorized for mi-

tigating fish and wildlife losses--both incurred and anticipated--represent less than one percent of the total estimated cost of the project.

SOURCES

Jones, J. 1978. Engineer, Libby Project, U.S. Army Corps of Engineers, Libby, Montana (personal communication).

Brown, D. L. 1978. Management and Planning Coordinator, Montana Department of Fish and Game (personal communication).

[illegible], E. 1978. Chief, Hatcheries Bureau, Montana Department of Fish and Game (personal communication).

Dice, S. 1978. Chief, Environmental Resources Division, U. S. Army Corps of Engineers, Seattle District (personal communication).

Kay, V. 1978. Real Estate Division, U. S. Army Corps of Engineers, Seattle District (personal communication).

May, B. 1978. Fishery Biologist, Libby Project, Montana Department of Fish and Game (personal communication).

May, B. and J. Huston. 1978. Kootenai River Fisheries Investigation, Phase I Part I. Montana Department of Fish and Game Report. In cooperation with the U. S. Army Corps of Engineers, Contract No. DACW67-73-C-0003.

Montana Department of Fish and Game. 1974. Revision of 1965 fishery analysis, Libby Dam project. Kootenai River, Montana (cover letter by W. Woodgerd, director, April 5, 1974).

United States Army Corps of Engineers, Seattle District. Design memorandum 50, reregulating dam and reservoir site selection and land requirement plan. January 1970.

United States Army Corps of Engineers, Seattle District. Libby additional units and reregulating dam, design memorandum 1, general design memorandum, phase I, plan formulation. August 1974.

United States Army Corps of Engineers, Seattle District. 1974. Libby additional units and reregulating dam, final environmental statement supplement.

United States Army Corps of Engineers, Seattle District. Libby additional units and reregulating dam. Design memorandum 1, general design memorandum, phase II, project design. July 1975.

United States Army Corps of Engineers, Seattle District. Libby additional units and reregulating dam. Supplement II to general design memorandum. January 1978.

[illegible], [illegible]. 1978. Administrator, Fisheries Division, Montana Department of Fish and Game (personal communication).

Attachments

Letter to C. Steinborn, District Engineer, U. S. Army Corps of Engineers, Seattle District, from Governor Forrest H. Anderson; February 7, 1972.

List of studies and actions planned by the U. S. Army Corps of Engineers that are related to determining fish and wildlife losses and ways to compensate for such losses.

State of Montana
Office of The Governor
Helena 59601

[illegible]

RECEIVED

February 7, 1972

Mr. Sydney Steinborn
District Engineer
U. S. Corps of Engineers
1519 Alaskan Way South
Seattle, Washington

Dear Mr. Steinborn:

I am writing to urge your immediate and personal attention concerning the lack of meaningful progress to compensate for the loss of big game habitat as the result of the Libby Dam project in northwestern Montana. It is my understanding that the Corps soon will initiate filling of the reservoir created by the dam. However, the State of Montana is without any formal assurance that those big game habitat areas to be flooded will be compensated for by your agency.

In the early days of the Libby Dam project, State officials were given to understand that all possible steps would be taken to compensate for unavoidable losses to fish and wildlife resources of the area. Discussions to this end began in 1966. In December 1970, the Montana Fish and Game Commission transmitted a proposal to the Corps outlining a method of acquiring game range from willing sellers, without employing condemnation procedures. A copy of this proposal is enclosed. More than a year has gone by without any action.

It is my understanding that [illegible] the Corps [illegible] of the [illegible] representatives will [illegible] of the [illegible] action, if any, is presently under consideration.

[illegible] I [illegible], I [illegible] Fish and Game [illegible]

I will not stand idly by and permit the filling of the [illegible] reservoir without full [illegible] [illegible] [illegible] [illegible].

Sincerely,

FORREST H. ANDERSON
Governor

cc: Congressional Delegation
Mr. [illegible]
Fish and Game Commissioners
Mr. William D. Ruckelshaus, E.P.A.
Mr. Gary J. Wicks

The following is a somewhat comprehensive list of actions carried out, or funded by the Corps of Engineers that are related to determining fish and wildlife losses and ways to compensate for such losses (information obtained through personal communication with Mr. S. Dice, U. S. Army Corps of Engineers, Seattle).

Contract with the Montana Department of Fish and Game. Tributary development and physical improvements. August 1972-June 1975.

Contract with MDFG. Habitat development on Young Creek. July 1969-June 1975.

Contract with MDFG. The effectiveness of mitigation measures on the Fisher River, Wolf Creek and Fortine Creek. July 1969-June 1972.

Contract with MDGF. Studies on Lake Koocanusa. July 1974-present.

Contract with MDGF. General studies on the Kootenai River, post-impoundment. July 1972-present

Contract with Batell Northwest (consultants). Studies on gas supersaturation. August 1974-September 1975.

Contract with the University of Montana. Biological monitoring of Lake Koocanusa. August 1972-September 1974.

Contract with the University of Idaho. Productivity and eutrophication in Lake Koocanusa. August 1976-present.

Contract with the UI. General water quality studies of Lake Koocanusa. August 1976-present.

Contract with the U.S. Geological Survey. Basic water quality monitoring of Lake Koocanusa and the Kootenai River. 1962-present.

Contract with Water Resources Engineers. Water quality modelling. 1971-1973.

Contract with the Cold Regions Research and Engineering Lab (U. S. Army Corps of Engineers). Satellite imagery. March 1974-October 1975.

Contract with the MDFG. Big game habitat improvement study and evaluation. June 1970-June 1976.

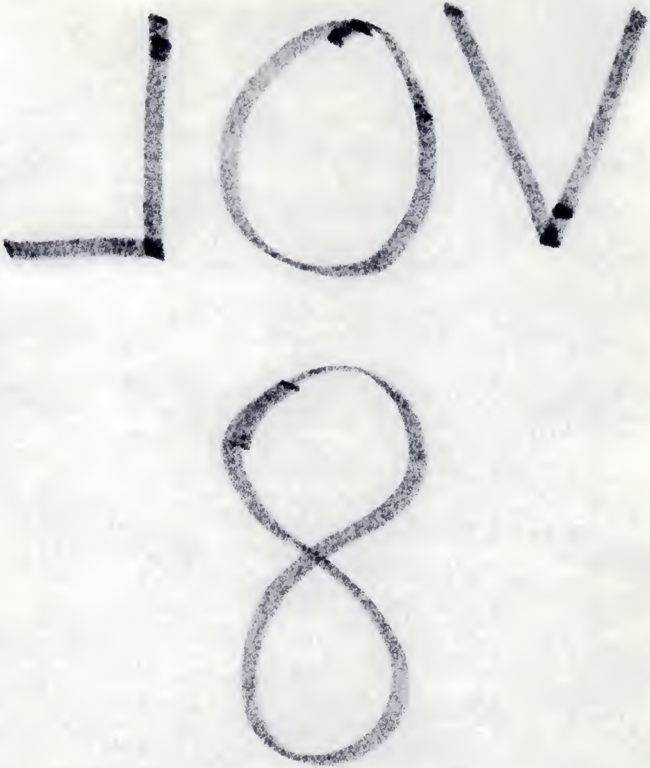
Contract with the MDFG. Railroad relocation and deer kill study. February 1969-June 1975.

Contract with the MDFG. Study of impact of highway relocation on bighorn sheep. October 1973-present.

Contract with Dr. John Craighead. Impacts of proposed reregulating dam on bald eagles. A notice to proceed has been granted and a plan of research is being reviewed at this time.

(Contract cost figures have been requested.)

VOL
8


⅃OV
8

RESERVING POWER FOR MONTANA, GENERATED FROM LIBBY AND THE REREGULATING DAM

Geographical power preference for Montana has been well established through the preferential distribution of power generated from Hungry Horse and Libby Dams. This policy should be continued for power to be generated from the four additional generators to be put in Libby Dam and any power generated in the Reregulating Dam. The following discussion documents this precedent.

Bonneville Power Administration ("BPA") has announced its intention to develop a formula for allocating energy from the Federal Columbia River Power System through publication in the Federal Register of "Procedure for Public Participation in Marketing Policy Formulation."(a) This procedure has been established to provide interested members of the public an opportunity to participate in certain BPA power marketing policies, especially as they relate to the allocation of energy after July 1, 1983.

It is the position of the State of Montana that, in the development of such an allocation formula, BPA is bound by, and must give full consideration to, the long-established and unqualified preference which is extended to Montana consumers of electricity in the disposition of Federal hydroelectric energy from the Hungry Horse and Libby Dam Projects, both of which are located within the State of Montana.

Implementation of Hungry Horse Project Preference

The preference to which Montana consumers are entitled in the sale of electric energy from the Hungry Horse Project was clearly implicit in legislation which authorized the construction of the project.(b) That legislation declared the purpose of the Hungry Horse project to be:

> * * * irrigation and reclamation of arid lands, for controlling floods, improving navigation, regulating the flow of the South Fork of the Flathead River, for the generation of electric energy, and for other beneficial uses, primarily in Montana but also in downstream areas * * *." (emphasis added)

The words, "primarily in Montana," were cited on a number of occasions by BPA spokesmen and other public officials as demonstrating that the Act intended that Montana consumers of electric power would have first claim on the energy produced at the project. While the Hungry Horse Project was under construction, BPA determined that all of the nominal prime power capability of the Project's power plant, but not in excess of one-half of the increase in total prime power at Hungry Horse and downstream Federal plants attributable to Hungry Horse storage, was reserved for marketing in Montana.(c) Pursuant to this policy, it was announced that several hundred thousand kilowatts of power would become available for delivery in Montana as the Federal System developed. Principal agreements completed or committed at that time included:

1. A contract executed with The Montana Power Company for 25,000 kilowatts of power at 80% load factor in 1952-53, increasing to 50,000 kilowatts the following year.
2. Power supply assurance for the Missoula Electric Cooperative, Lincoln Electric Cooperative, Ravalli Electric Cooperative and Northern Lights, Inc., then being served by BPA. (Flathead Electric Cooperative and Vigilante Electric Cooperative later were added to this list and BPA subsequently committed power to the Glacier Electric Cooperative under authorizing legislation.)
3. A contract for a supply of electric power to the Harvey Machine Company for an aluminum reduction plant to be located in the vicinity of Kalispell, Montana. (This contract later was transferred to the Anaconda Aluminum Company for its operations at Columbia Falls, Montana.)
4. A commitment of power to Victor Chemical Company for an elemental phosphorous plant near Silver Bow, Montana, later transferred to Stauffer Chemical Company when it acquired Victor.

Other industrial companies at the time filed requests with BPA for Montana plants which would use Federal power, and these requests were considered under the Montana preference provision. By December 12, 1952, BPA had reserved 198,000 kilowatts of power

for sale in Montana pursuant to its policy determination.

BPA Official View Presented to Congress

At the time the Congress was considering Department of the Interior appropriations for Fiscal Year 1950, BPA's official view of the Montana preference was clearly enunciated before Congressional Committees by Dr. Paul A. Raver, then Bonneville Power Administrator.

Discussing BPA transmission lines from the Hungry Horse Project to Spokane, Washington, and Anaconda, Montana, Dr. Raver stated:

> "* * * the tie line will be used for whatever power needs of that area The Montana Power Company or any other agency that is in Montana wants it for."(d)

Later, in discussing the integration of the Hungry Horse Project with other plants on the Columbia River System, Dr. Raver stated:

> "I think you have to be fair and let the people of Montana have the power that they normally would get out of Hungry Horse, and I assume they will get at least that much. * * * I certainly do not think that the people of Montana are going to be properly served unless they have an opportunity for some big industrial development out of that added power."(e)

Appearing before a Senate Subcommittee on the same Interior Department appropriations bill, Dr. Raver said:

> "We believe that western Montana has first claim to this power. Furthermore, economical marketing of Hungry Horse power requires that a substantial block be sold in western Montana."(f)

The question of Montana's preference in the sale of Hungry Horse power was cited in [illegible] by Samuel Moment, economist for BPA, in a series of articles published by "Pacific Northwest Industry," a University of Washington magazine. In that series, Dr. Moment wrote:

> "Under the law, the State of Montana has priority for a substantial portion of Hungry Horse power. This requirement led to the location in Montana of one aluminum plant and, therefore, did not deprive Washington or Oregon of any assured power supply."(g)

The commitments made in Montana for power developed at site at or downstream from Hungry Horse water demonstrate BPA acceptance of, and support for, the principle of a Montana geographical preference in the sale of power developed in the State.

Subsequent Legislation Confirmed Montana Preference

Recognition of Montana's preference in the sale and distribution of Federal energy attributable to projects in the State of Montana was not limited to acts and determinations at the time the Hungry Horse Project was constructed.

The Congress passed and the President signed legislation in 1963 to guarantee electric consumers in the Pacific Northwest first call on electric energy generated at Federal hydroelectric plants in that region.(h) That Pacific Northwest Power Preference Act (S. 1007) contained a specific reservation of Hungry Horse power for Montana. In hearings before the Senate Committee on Interior and Insular Affairs in connection with the legislation, it was pointed out that the bill provided:

> "Nothing in this Act shall be construed to modify the geographical preference of power users in the State of Montana which is established by the Hungry Horse Dam Act (Act of June 4, 1944, 58 Stat. 270), as amended."(i)

A section-by-section analysis of the legislation, prepared by the Department of the Interior, contained these comments:

> "Section 4 - While the sections referred to above would make, by their terms, a partial modification of the geographical preference in favor of Montana which is contained in Section 1 of the Hungry Horse Dam Act, the savings clause in Section 8 of the bill prevents them from having that effect. The existing preference in the Hungry Horse Dam Act will remain unaffected.

> "Section 2 - * * * Such exceptions (to the prohibition against sale, delivery or exchange for use outside the Pacific Northwest of any Federal hydroelectric power except surplus energy and peaking capacity) include * * * sale or exchange in eastern Montana of Hungry Horse power subject to the geographical preference in favor of Montana in Section 1 of the Hungry Horse Dam Act.
>
> "Section 8 - * * * As pointed out in the discussion under subsection (b) of Section 1, the geographical preference in favor of power users in Montana which is established by Section 1 of the Hungry Horse Dam Act is not affected."(i)

Geographical Preference Applied to Libby Dam

The second major Federal hydroelectric project constructed in western Montana was the Libby Dam Project on the Kootenai River in the northwestern part of the State. Legislative history supports the application of Montana's geographical preference with respect to that project.

When planning funds for Libby Dam were being considered by the Senate, the following colloquy took place between Senator Mike Mansfield of Montana and the Chairman of the Appropriations Committee:

> "MR. MANSFIELD. The distinguished chairman of the Committee on Appropriations will recall that my colleague from Montana (Mr. Metcalf) and I appeared before the committee in behalf of a $350,000 appropriation to enable the Corps of Engineers to resume planning on Libby Dam in northwestern Montana.
>
> "During the course of that testimony, both my colleague, Mr. Metcalf, and I stated that it was our understanding that insofar as the Libby project was concerned, there would be a power preference for Montana, based on the Hungry Horse project. Is that correct?
>
> "MR. HAYDEN. Yes."(j)

Later on, in the same discussion, Senator Metcalf further stated:

> "It is my understanding, and I think it is also the understanding of the senior Senator from Montana (Mr. Mansfield), that there would be the general power preference for this (Libby) dam under the same conditions and proce-

dents as at Hungry Horse."(j)

The intent of the Senate was clearly reflected in the following exchange:

> "MR. MANSFIELD. And there is no question that Montana will have a prior power preference based on that legislation?
>
> "MR. HAYDEN. That has been the understanding all along. * * * It is necessary to begin planning now, so the construction work can begin within the time specified in the treaty.
>
> "MR. MANSFIELD. And the power preference for Montana will be included?
>
> "MR. HAYDEN. Yes."(j)

Senator Mansfield again raised the point of a geographical preference for Montana in the Libby Dam appropriations when they were being considered in 1966. During debate on the floor of the Senate, Senator Mansfield referred to a previous colloquy related to power preference when the Columbia River Treaty was under consideration. That exchange included the following:

> "MR. ELLENDER. * * * It is my belief that Montana is entitled to have priority in the distribution of electricity generated by the falling water in that locality. * * * Montana would be entitled to electricity produced because of its proximity to the facility that produced the electricity.
>
> "MR. MANSFIELD. In other words, we should be given first priority on our own resources. That was the committee's intent and the way the committee wants it carried out?
>
> "MR. ELLENDER. That is correct."(k)

Senator Mansfield continued to pursue the question of a Montana geographical preference in contacts with BPA officials. Responding to one such query, Kenneth Holum, the Assistant Secretary of the Interior, responded to Senator Mansfield by letter of April 12, 1967, as follows:

> "A Libby Project allocation to Montana computed in the same manner as the Hungry Horse allocation would be 205,000 kw. This added to the 221,000 Hungry Horse allocation would total 426,000 kw. The estimated loads presently under contract (in Montana) already exceed this amount. It would appear, therefore, that the objectives of a Libby Project allocation have already been accomplished. In summary, the Hungry Horse Act and subsequent power allocation to Montana attracted desirable electroprocess loads to the State and the subsequent scheduling of Libby made it possible for BPA to serve the expanded requirements of its customers in Montana."

Conclusion

The record of Montana's geographical power preference for the sale and distribution of energy produced by Federal hydroelectric projects within the State is well established through public law and Congressional intent, and the power allocation determinations which have been made in the past by BPA concur in, and support, that record.

The policy of geographical power preference should be continued now by applying this preference to power generated by the four additional power units in Libby Dam and all power that may be generated by the proposed Libby Reregulating Dam.

FOOTNOTES

(a) - Federal Register (42 FR 62050), December [illegible], 1977.

(b) - Public Law 534, 78th Congress, 2nd Session (58 Stat. 887).

(c) - Statement by U.S. Senator James E. Murray, Great Falls, Mont., Tribune, December 12, 1950.

(d) - House Hearings, Interior Department Appropriations, FY 1950, Part 2, Page 109.

(e) - Ibid, Page 115.

(f) - Senate Hearings, Interior Department Appropriations, FY 1950, Part I, Page 1202.

(g) - "Pacific Northwest Federal Power Program and the Public Welfare, by Samuel Moment, Pacific Northwest Industry, October, 1952, Page 5.

(h) - Public Law 88-552, 88th Congress, 1st Session (78 Stat. 756).

(i) - Pacific Northwest Power Preference: Hearings Before the Senate Interior & Insular Affairs Committee, April 1, 1963.

(j) - Congressional Record, March 27, 1961, Page 4585.

(k) - Congressional Record, October 20, 1966, Page 27951; also Congressional Record, October 7, 1966, Page 24755.